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THE "SENDING MAN'S" DREAM.

The "sending man" to his weary bed
His footsteps wended with awkward tread,
And though to sleep he quickly went,
A night of horror and dread he spent;
For, as he tumbled and rode the horse,
He thought he beheld the ghost of Morse.
"Oh, wretch!" it cried, "while thou art learning,
At every dot my bones are turning;
With pain and anguish at every click,
Thy awkward writing my soul makes sick.
Know, luckless wight, that in every 'ground'
I am 'cut in,' and can hear the sound,
In countless circuits, the whole world 'round;
And O! thy writing my soul doth vex,
More than a shaky quadruplex.
Better for thee it were to betake
And drown thyself in the deep Salt Lake;
But thy writing's so light, when I come to think,
I hardly believe thy body would sink;
So go to sea for several seasons,
And be a diver, for divers reasons;
And give us a greatly needed rest
From the terrible hand with which thou'rt blest.

"When you come to a *V*, you make a dive,
And come to the top—Oh, sakes alive!—
With a figure 4; and your figure 5
From three small ciphers can ne'er be told,
Though many have tried it, young and old;
Then, when you come to a letter *P*,
The other man is all at sea.
Have some respect for my mouldering dust,
Or rest no more; for, if it must,
My spirit each night your dreams shall haunt,
And over your pillow the grave-clothes flaunt."

And ever since that little dream
His writing steadier doth seem.
He is so careful, he even tries
To cross his *T*s and dot his *I*s.
As over the wire his writing speeds,
Of foreign wars and murderous deeds,
He's careful that his hand's the best,
And never will again molest
Our patron saint in his peaceful rest.

SAN FRANCISCO, CAL.

Electric Lighting—XI.

About the time that Gramme was experimenting with his first machine, another French electrician, M. Worms de Romilly, was at work also, with the object of improving on preceding generators of electricity, and in 1866 he secured a patent in France for his improvements. It is said that none of his machines ever worked, practically, but yet his ideas deserve mention as being, in the main, correct. He appears to have deduced his inventions directly from the

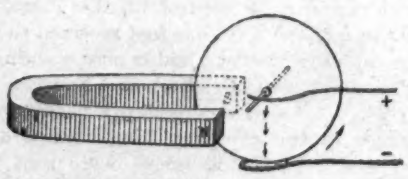


FIG. 42.

consideration of the principles involved in induction, and from a somewhat crude understanding of Faraday's conception of lines of force; and when viewed in this light, his originality certainly deserves great credit. His line of thought started with Faraday's modification of Arago's "disc" experiment. Arago had discovered that a disc of copper or other metal placed in a magnetic field would rotate under the influence of a current passed through any radius of the disc by means of conductors touching the disc at the circumference and at the axis. In 1831, Faraday had discovered that when the copper disc was made to rotate by artificial power (Fig. 42), so as to cut the lines of force in the magnetic field, a current of electricity was generated in the copper disc, which could be collected by conductors applied as in Arago's experiment. It is interesting to note here, by the way, that this experiment of Faraday furnished the first instance of "reversibility," the principle of which, as we saw, was first propounded only thirty-three years later by Pacinotti. In this disc the induction is easily explained, if we consider it to be the same as a wheel whose spokes are infinite in number and touch each other, and each of which, in rotation, cuts across lines of force when placed at right angles to them, in a magnetic field. The electromotive force of this current would depend on the strength (density) of the field, on the speed of rotation and on the length of the radii, for the effect was evidently the same as if a single wire equal in length to the distance between the centre and the circumference had

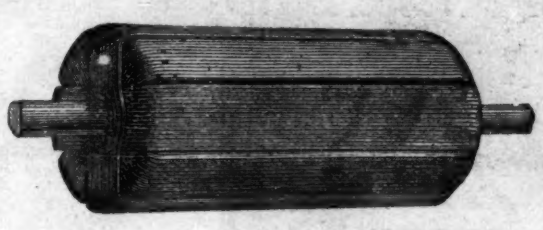


FIG. 43.

been attached to the collectors and moved across the lines of force with the same rapidity.

M. de Romilly sought to obtain better conditions for cutting the lines of force, whereby a greater length of wire could be subjected to inductive action. He devised an armature made of a cylinder or ring of iron, wound with wire, like the Gramme ring, though instead of winding the wire in a continuous helix around this ring he wound it in two portions, one the reverse of the other half, so that they might be connected in series to a commutator, which had, therefore, only two segments, like Pixii's, Siemens', etc. It is almost needless to say that this arrangement did not prove very practical. It is true there was a period of the rotation during which both halves of this armature tended to help the useful result, because the induction in the one became added to that in the other; but there was also a period when one-half of each section of the winding was on one side of the field, while the other was on the other, during which the inductive actions would neutralize each other. It was a Gramme ring with two sections only, each section covering half of the ring, and it was manifestly worse than to have had the sections small, so that they could clear one side of the field entirely before entering the other.

M. de Romilly's theory of the ring appears to have been correct in all essential particulars, and his arrangement of the field magnets so as to act on all surfaces of the ring, on each side of the field, is a good enough proof of this fact, since it realized what many inventors have sought to do since, notably Fein and Gülcher. But he failed to hit the proper idea of of commutating the wire turns by successive sections, as Pacinnotti and Gramme did, and that was the secret of his failure. Fig. 48 shows a form of armature, also devised by de Romilly, which is of interest, since we find it to-day as the basis of the Siemens-Alteneck, Edison and Weston armatures of the present types. The cylinder, of iron, was made comparatively small in diameter, and long; the wire was not wound inside at all, but the surface was flattened at diametrically opposite points and the wire wound lengthwise over these surfaces. First one coil was wound; then another, so as to overlap it at the ends, and finally a third and a fourth in like manner. Had M. de Romilly been acquainted with Pacinotti's principle of commutation, it is possible he would have preceded Gramme as the real starting point of the impulse which electric lighting received with the advent of the Gramme machine, for in this case he came near making a good machine. De Romilly's machines, however, were all magneto-electric, for it is to be borne in mind that the "dynamo" principle did not become known until 1867, a year after he secured his patent.

SIEMENS-ALTENECK.

In 1875 Siemens produced a new generator, of which the most important feature was the armature, which was of a new form, devised by von Hefner Alteneck, an electrical engineer in the employ of Siemens Brothers. It was shown in explaining the function of the Gramme ring that the lines of force pass into it from each pole, on the outside surface mainly; comparatively few pass around so as to enter it at the sides, and still fewer, or none at all, at the inner surface. Since those portions of the wire corresponding to the inner surface of the ring experience little or no inductive action, it is clear that they only make so much more resistance without adding to the electromotive force, and detract from the current produced by the other portions. So M. von Hefner Alteneck designed his armature so as to give it as much outside surface as possible by making it cylindrical; and by winding it on the outside altogether, as in de Romilly's modification (Fig. 43), he avoided the useless resistance inside of the cylinder. It is true that the wire now crossing from side to side at the ends was also a resistance without useful return, but this was reduced by making the diameter of the armature small compared to its length. We have also said that the inductive effect of the magnetic field of the iron core of the Gramme ring itself during rotation causes local currents among the molecules of the iron, which expend their energy in the development of heat. M. Alteneck accordingly, in order to avoid this source of loss, made the core fast and revolved only the wire around it; and this was the most interesting peculiarity of this armature. Fig. 44 shows this armature

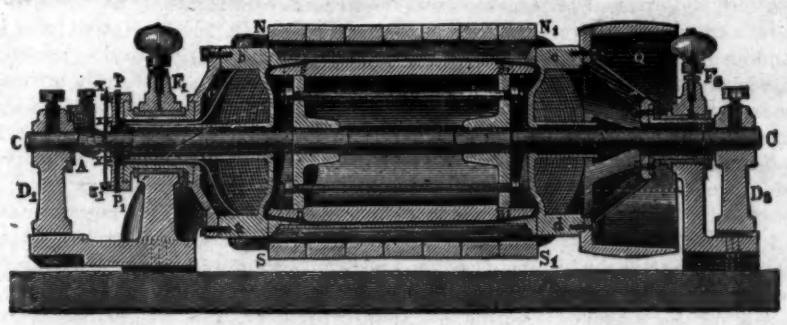


FIG. 44.

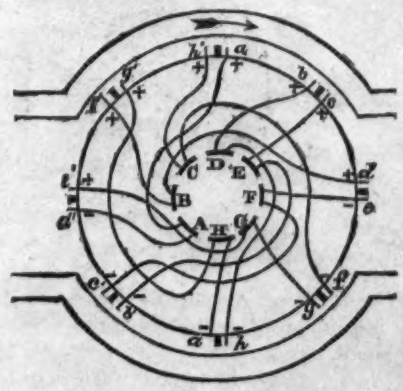


FIG. 45.

section. The iron core $s s' n n'$ was made fast to the shaft $e e$, by two discs bolted to each other, the shaft itself being fastened to the supports $D_1 D_2$. Around this cylindrical core was a thin drum $a b c d$, of German silver, ending at each end in a tube fitting around the shaft and forming the axis of rotation for this drum by bearing in journals FF with oil cups, a pulley being fitted at one end on this hollow axis, while the commutator was at the other end. The wire was wound around the German silver drum in eight or more distinct sections, in the manner shown in Fig. 43. These coils were all connected into one continuous circuit and the eight commutator segments after the Gramme principle, but the connection between the coils was very peculiar. Fig. 45 is a diagram of these connections wherein the letters $A\ B\ C\ D\ E\ F\ G\ H$ represent the commutator segments and the letters $a\ a'\ b\ b'\ c\ c$, etc., indicate the two ends of each coil. The magnetic field of this machine also had a peculiar form of construction, as shown in Fig. 46. Two flat horseshoe magnets $E\ E$ and $E\ E$ were connected so as to have a common north pole $N N$ in the same field-piece, and a common south pole $S S$, in the other. These magnets were flat, and the field poles were not all in one piece, but of several small pieces placed side by side, as shown in section in Fig. 44. This was for the purpose of preventing induction in the field magnets themselves. Every rise and fall of the current in the field magnets produces a movement of ebb and flow in the lines of force of the field, and thus molecular induction can take place in its own substance,

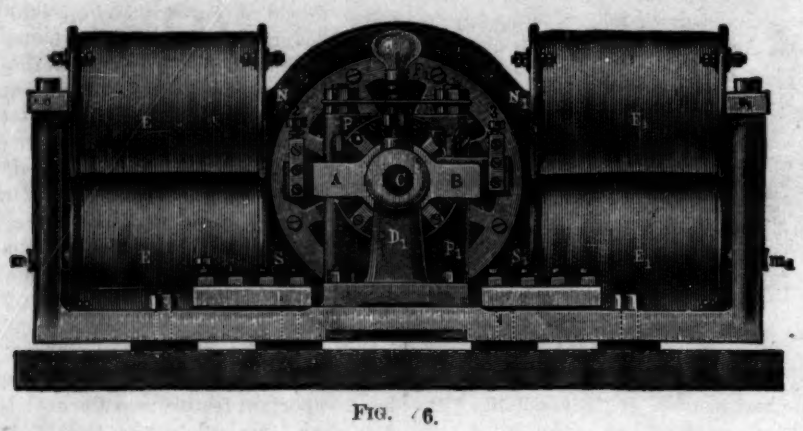


FIG. 46.

and give rise to heating. As the currents induced would have the tendency to pass from side to side of the field piece, that is to say, at right angles to the cutting motion of the lines of force, by making slits lengthwise in the field plates they are restricted and isolated in a smaller mass. It would be better if the pieces were yet smaller but as the gain beyond this limit is small compared to the extra cost of build, the slits are made fewer in number.

It was shortly found that the cost and complication of constructing armatures with stationary cores was too great in comparison with the benefits derived from their use, and so their use was abandoned. To-day, the wire is wound directly on the core, which revolves as in the Gramme armature. The sections are made very small and numerous as in the Gramme machine, and for the same reason. Fig. 47 shows this later modification of the Siemens-Alteneck machine, which works very satisfactorily, and which has come into extensive use in Europe in electric lighting. It is claimed that this mode of winding really attains the object of making the internal resistance, as compared to electromotive force, smaller than in the Gramme machine of the same size, for the reason explained above; but no competitive results have ever been produced to confirm this assertion; and in the present state of perfection,

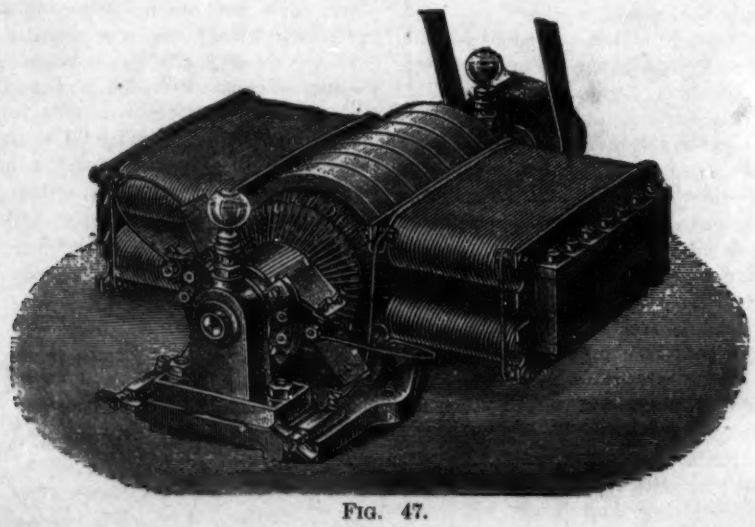


FIG. 47.

to which both these excellent generators have been brought, it is quite probable the difference, if any, must be extremely small.

LONTIN.

In 1875, M. D. F. Lontin constructed a new form of continuous current machine which attracted considerable attention in France, where it found its way into application for a time with success. Fig. 48 is a diagram of the machine. Ten bars of iron, of somewhat conical form, are fitted radially into a central hub P, so as to make a star-shaped wheel. Each of these radial bars is the core of a coil of wire; these coils are connected to the adjacent ones and to the commutator, the arrangement being exactly as in the Gramme commutator. But the collectors do not touch at the same relative points as in the Gramme machine. In the Gramme and Siemens-Alteneck machines the point of reversal of each section is at right angles to the lines joining the two poles. In this form of machine it is different. As the armature revolves between the poles $N S$, and each coil passes in turn opposite each pole, it experiences the reversal, and there is the point of commutation.

This is because the field acts upon each radial core individually, as in the Pixii, Saxton, and Stoehrer machines, where we find that the increase of lines of force stops just opposite each pole and then allows the decrease to begin. This is precisely what happens here, and consequently there are coils in all stages of increase or decrease relatively to either pole, and the result is to make a current of unbroken character as in the Gramme machine.

In order to increase the number of active coils on each side of the armature, Lontin placed four such series on the same shaft (Fig. 49), each being arranged so that its coils came just a little behind the other. This was really the same as having a single wheel of 40 coils, brought more closely to each other. This machine never realized a very high degree of efficiency, however. The induction in the cores, and their consequent heating, was very great. Of course the amount of power converted into heat in this way was a loss so far as useful effect was concerned. It was also open to another serious objection. We stated as a requirement of a good machine that the wire should pass close to the inducing field for the greater portion of the revolution of the armature, because it is near the field pieces that the lines of force are most densely distributed. A great part of the wire of each coil is so much nearer the centre of rotation that its velocity of motion is not so great, and as the electromotive force is proportional to the rapidity of the cutting action across lines of force, it is plain that even in a uniformly strong magnetic field the inner turns of these coils would not give nearly the useful result produced in the outer turns, which not only pass in a dense field, but at a greater velocity. Now, the current generated in the good portions has to pass through the bad or useless portions. This means more than a simple increase of electrical resistance. It means an increase of resistance to motion of the armature; for the current passing through all these cores makes them magnetic, and, unfortunately, this magnetism is such as to oppose the motion of the armature, simply in consequence of Lenz's law. In many installations where it was first used, this machine has been superseded by others of the Gramme or Siemens type, which are by far more economical in working.

C. O. M.

THE TELEPHONE IN THE SANDWICH ISLANDS.—It is said that there are more than 300 telephone wires in use in the city of Honolulu. Telephonic communication has also been established throughout the islands on the plantations. Some of the planters are cutting their cane beneath the rays of the electric light.

The Telephone in Japan.

At the annual meeting of the Society of Telegraph Engineers and of Electricians in London, on Dec. 14, Mr. Thomas J. Larkin read a paper on "The Application and Extension of Telephonic Communication in Japan." The use of telephonic communication for police purposes, he said, had never been considered in England, but in Japan

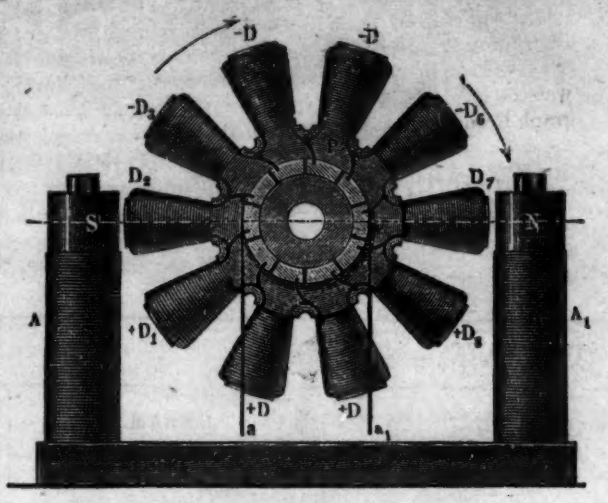


FIG. 48.

it was carried into effect with great success. In one of the principal cities, containing 300,000 inhabitants, the police force had at first great difficulty in keeping order, consequently, in 1878, a telegraphic system with nine offices was introduced, worked by Morse printers. The wire used was of No. 11 gauge. On the invention of the telephone the latter instrument was substituted for the printers, and with great success, as the intermittence in the work with the ordinary instruments was much disliked by the operators, who were continually resigning their situations, causing great inconvenience. The Bell telephones were the instruments employed, and were worked by the police staff without difficulty. The first were purchased, but afterwards they were manufactured locally with perfect success. Four telephones on one circuit were employed in some cases, the stations being called up by so many strokes on a bell. One of the lines was eight miles long, and ran on poles with other working wires; although the inductive disturbance was very strong it did not prevent proper working. Experiments were subsequently tried on 57 miles of railway, with 17 stations, with every success, and

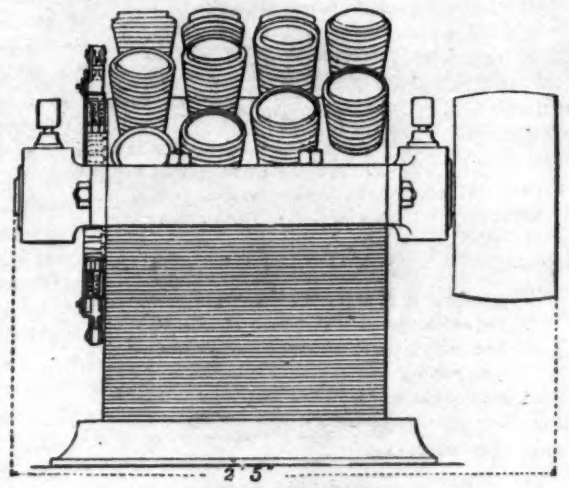


FIG. 49.

it was finally decided to adopt the telephones for block as well as ordinary signalling. Several instances were given of the value of telephonic communication as compared with the ordinary telegraph system. By means of shackles placed on the poles at every mile, it would be possible, in case of a railway accident, for the guard to connect up a hand telephone and communicate with the nearest station.

A Live Independent Telegraph Company.

The Philadelphia, Reading & Pottsville Telegraph Company, which is under the control of the Philadelphia & Reading Railroad Company, has just received three sets of duplex telegraph instruments, and is now working duplex between Philadelphia and Reading, and between Reading and Pottsville. This step was rendered necessary by the rapid increase in the company's business. During the year just ended 2,800,000 messages were sent, 2,500,000 trains reported, and telegraphic service was rendered to five newspapers. The company has twelve wires between Philadelphia and Reading, seven between Reading and Pottsville, and three between Reading and Harrisburg. It has more than 400 offices, and employs about 600 operators. No accidents attributable to the telegraph operators occurred during the year. The lines have been greatly improved and many of the offices have been refurnished with new instruments and improved facilities. The showing of the company is very creditable to the general superintendent, Mr. O. W. Stager, whose office is at Reading, Pa.

Still Another Suit Against the Western Union.

Mr. Frederick Bill, of Groton, Conn., has brought suit in the United States Circuit Court in this city, to set aside the lease of the Gold & Stock Telegraph Company to the Western Union Telegraph Company, and to have a receiver appointed to take possession of the property of the first-named corporation for the benefit of the stockholders. He says that in 1881 and 1882 the Western Union Company was the holder of 18,905 shares of the Gold & Stock Telegraph Company's stock. About the 1st of January, 1882, the defendants, assuming to act as directors of the Gold & Stock Telegraph Company, leased the lines and business of the company to the Western Union Company for ninety-nine years, for a rental of 6 per cent. per annum upon $4,894,400 of the capital stock, and 7 per cent. on $434,700 of the bonds of the Gold & Stock Company.

Among the property alleged to have been transferred by the lease were various stocks of other companies held by the Gold & Stock Telegraph Company. These stock assets are given as $300,000 of the stock of the Philadelphia Local Telegraph Company; $82,666 stock of the Central District & Printing Telegraph Company of Pittsburg; $287,500 stock of the Gold & Stock Telegraph Company of California; $95,100 stock of the Telephone & Telegraph Company of Michigan; $125,000 stock of the Bell Telephone Company of Philadelphia, $1,200,000 stock of the American Speaking Telephone Company, and $400,000 stock of the Metropolitan Telephone & Telegraph Company. The complaint asserts that the marketable value of these stock assets was more than $3,750,000, and the marketable value of the other property transferred by the lease was over $5,065,000, and the total value of the property was $9,000,000, and that the gross income received by the Western Union is largely in excess of the rental paid. It is charged that the lease was not made for any legal purpose, but to enrich the Western Union Company at the expense of the other stockholders of the Gold & Stock Telegraph Company, and that the lease was not properly ratified by the necessary three-fifths of the directors and stockholders. It is further averred that the Gold & Stock Telegraph Company does not in law or fact still exist, as the directors only meet to declare a dividend when the rental is paid.

Judge Brown directed the defendants to show cause why the petition should not be granted.

President Green, of the Western Union Company, says that the proposition to lease the Gold & Stock Telegraph Company came to the Western Union from the former, and the lease was a matter of discussion for months before it was concluded. "The lease," he says, "went into effect last January. Under it the Western Union guaranteed the interest and principal on the Gold & Stock bonds and an annual dividend of 6 per cent. on its stock for ninety-nine years. I think this a very fair contract and equitable to both parties, and I never knew a telegraph lease to be made where there was so little dissent on the part of the stockholders. We sent out the contract and secured the assent not only of three-fifths of the persons in interest, as the statute directs, but of three-fifths outside the Western Union. The stock which was in the treasury of the company was distributed as a dividend and increased the holding of the Western Union to a little over $1,900,000, which is still short of two-fifths of the entire capital stock of the company. As for Mr. Bill, he has ratified the lease, I should think, by drawing his rentals without protest and receipting for them. Once before a suit of this kind was begun, but we bought the man's stock and that ended it."

Progress of the Telephone in Canada.

We learn from the *Shareholder and Insurance Gazette*, of Montreal, that the Bell Telephone Company, of Canada, now has exchanges or agencies in nearly 100 cities or towns in Canada, has some 4,250 subscribers and gives employment to about 250 people. The company, at its factory in Montreal, manufactures all the instruments which are used in Canada.

	Subscribers.		Subscribers.
Montreal has about	866	Winnipeg has about	250
Toronto "	525	Quebec "	240
Hamilton "	320	London "	220
Ottawa "	350	Halifax "	170
St John, N. B., "	275	Victoria, B. C., "	130

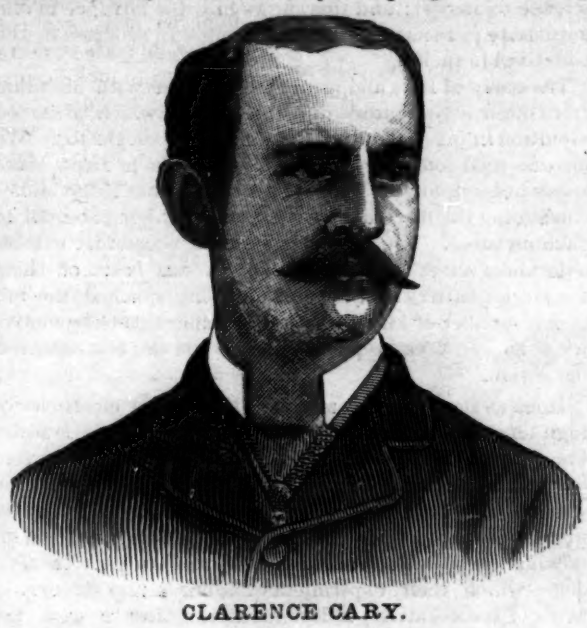
The company is about opening exchanges at Brandon, Emerson and West Lynne, Manitoba; Stratford, Galt, St. Catharines and St. Mary's, in Ontario, and Three Rivers, in Quebec. The company owns a cable connecting Windsor with Detroit, giving communication with the extensive system of the Michigan Telephone Company, and has just laid another cable between Quebec and Levis. It has also built a line connecting Cobourg with Guelph, through Port Hope, Newcastle, Bowmanville, Oshawa, Whitby, Toronto, Springfield, Palermo, Watertown, Hamilton, Dundas, Galt and Hespeler, giving the subscribers in these places a connection with their neighboring towns. This line will now be extended through Brantford, Paris, Woodstock and Ingersoll to London, which is already connected with St. Thomas. These lines do not interfere with the telegraph companies, nor reduce their receipts, because they are used for personal communication only, and in cases in which the parties would not use the telegraph. About 1,000 miles of telephone lines were constructed in Canada in 1882.

The President and Secretary of the T. M. B. A.

We present to our readers to-day portraits of the worthy president and secretary of the Telegraphers' Mutual Benefit Association, in connection with the article on the association which we published last week.

Both gentlemen, as will be seen from their portraits, are young men, to fill the responsible positions they hold in one of the greatest corporations of this or any other country—positions which both have attained by their own merit and exertions.

For the interest in the welfare of the telegraphic fraternity which they have shown by accepting the exacting



CLARENCE CARY.

and unremunerative duties of president and secretary of the T. M. B. A., Messrs. Cary and Brewer should be entitled to the warm esteem of telegraphists everywhere.

CLARENCE CARY.

Mr. Cary was born in Fairfax county, Virginia, on March 18, 1846. The breaking out of the war interrupting his studies at school, he entered the Navy, where he served for four years as an officer; afterward he performed some service as a correspondent, and settled in New York, where he took up the reading of the law, which was prosecuted diligently for several years.

In 1874, Dr. Norvin Green, then vice president and now president of the Western Union Company, had, incidentally with his other duties, charge of what is known as the claim service of the company, a feature, which, with the extension of the business, became necessarily large and exacting. Feeling need of assistance Dr. Green secured Mr. Cary's appointment, to whom was given the special oversight and management of the numerous claims for damages, and suits arising out of errors in messages.

Mr. Cary has, by his successful disposition of the business intrusted to him, organized and put on a permanent basis the Law Department of the Western Union Company. Through this department now proceed all instructions to lawyers, the preparation of all cases for the Law Committee of the company, and the record and direction of all claims, litigations and tax matters. Of course, with an annual transmission of 38,000,000 messages, the claims

A. R. BREWER.

for damages are frequent and various. Questions arising under the taxation laws of each State are also numerous and peculiar, requiring much careful attention. This very extensive business is performed in this Law Bureau with much acknowledged efficiency, under Mr. Cary and three or four capable assistants.

ABIJAH RITTENHOUSE BREWER.

Mr. Brewer was born in Hunterdon county, New Jersey, on May 3, 1847, and received his education at Lewisburg, Pa. At the age of 16 he became a printer in the office of the Lewisburg *Chronicle*, where he learned telegraphy, the telegraph office being in the newspaper office. Having acquired this art, Mr. Brewer entered the service of the United States Telegraph Company at Trenton, N. J., and after a few months was appointed manager of the American Telegraph Company's office at Wilkesbarre, Pa., where he remained until the consolidation of that company with the Western Union.

During all this period Mr. Brewer had diligently studied stenography, and in 1867 he became stenographic amanuensis for General T. T. Eckert, in New York. In 1872 Mr. Brewer became assistant to Vice President George H. Mumford, of the Western Union Company, and was appointed secretary of the company in 1875, which office he still retains, and the duties of which he performs with great tact and ability.

Mr. Brewer is secretary of the American Speaking Telephone Company and the Gold & Stock Telegraph Company, and has a large and varied correspondence in connection with the transfer of the stocks of the three companies. He also serves as secretary of the Executive, Law and Expenditure Committees of the Western Union Company and of the Board of Directors, with acknowledged skill, assiduity and care.

Death of a Veteran Telegraph Clerk.

Mr. William Martin, the well-known receiver at the main office of the Western Union Telegraph Company, in Boston, died at his residence, Boston Highlands, on Jan. 4. The cause of his death was pneumonia. He had been connected with the telegraph service in Boston for a period of nearly 40 years, first with the House Printing Telegraph Company, later with the old American Company as manager, and finally with the Western Union since 1863, holding the position of receiver continuously since. He was a member of the Telegraphers' Mutual Benefit Association, secretary of Columbia lodge, F. and A. M., for past fifteen years, also a Knight Templar. Of a kindly disposition, ever ready to extend a helping hand to those who, through misfortune or otherwise, solicited his assistance, his death will be greatly deplored. He leaves a widow and two children, and was 57 years old. His funeral took place on Jan. 7, and was largely attended by business men and the telegraphic fraternity.

The little chapel was too small to accomodate those who came to mingle their grief at his loss and testify by their presence the respect in which he was held while living. No department of a commercial nature was without its representative. From the telegraph company with which he had so long been identified there were Superintendent Roche, Manager Henderson and Cashier Harlow, and Messrs. Murphy, Ryan, McGrath, McElaney, McLaughlin, and others from the various departments of the Boston office; from the Gold & Stock Telegraph Company, Manager Sayward; from the Rapid Company, Manager Pettingill; and from the Mutual Union, Messrs. Gilraine and Cochrane. Among the prominent business men were Mr. Lotts of Holmes, Booth & Hayden; Mr. Marvin of the firm of T. R. Marvin & Sons; Mr. Lindergreen of the Cunard line; Mr. French of the Merchants' Dispatch Company, etc. The floral tributes were elaborate and beautiful. His office associates contributed a magnificent representation of "Gates Ajar," and the messengers furnished a pillow of rest.

Mr. Martin was a warm friend of Professor Morse, and when the latter was in Boston he never failed to call on him. Though he was immensely popular with the general public, with whom he had dealt so many years, yet his kindly qualities were best known to those with whom he was daily associated. When he first engaged in business in Boston there was only a single wire to New York, and all the through and way business of that period was transacted over it. From the little company of nearly half a century ago, Mr. Martin has come down on the surface of amalgamations and consolidations to the great and powerful organization known all over the world. His first connection with the Western Union dates back to 1862, when he had charge of the entire delivery service in New York city for two years. Since then he has been at the head of the receiving department of the main Western Union office in Boston.

Congressional Investigation of Telegraph Abuses.

The sub-committee of the House Judiciary Committee, having in charge the bill "for the regulation of telegraph and cable companies," this morning heard Mr. Peck, secretary of the Mutual Union Telegraph Company, in explanation of the hardship to which his company is subjected by reason of the refusal of the Western Union Telegraph Company to receive dispatches on the same condition as they receive them from private citizens. Mr. Peck cited instances occurring at the Chicago offices of the company, in which dispatches left for points not reached by the Mutual Union had to be returned to the sender, and by him carried to the Western Union Office. The committee decided to give the Western Union and other telegraph companies an opportunity to be heard at an early day, to suit their convenience.

A PROPOSED PACIFIC CABLE.—Captain Audley Coote, an Australian projector, proposes the establishment of a cable line from the British colonies, *via* the Sandwich Islands, to San Francisco.

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AND
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NEW ADVERTISEMENTS.

In the growth of our paper in circulation, size and general improvement, the value of its columns for reaching those engaged in electrical pursuits or interested in electrical matters has not failed to be appreciated by advertisers. In order to better enable our readers to notice anything new which advertisers may have to offer them, we shall henceforth give in this column a list of new advertisements as they appear in each number. The following will be found in to-day's issue:

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INDEX TO VOLUME XIII.

As promised last issue, we send out as a supplement to the present number an index to volume XIII of THE OPERATOR. We are only sending them to those who were subscribers to that volume. If any one who is binding volume XIII—even though he has not yet renewed his subscription for the present year—should not happen to receive a copy of the index, we shall be glad to send him one on application.

PROGRESS IN ELECTRICAL SCIENCE IN 1882.

The progress which our science has witnessed during the year 1882 partakes rather more of the character of a reaction from a period of activity in practical applications than of a deliberate sally into the realm of unknown laws and principles. The year 1881 may be said to have concentrated the whole attention of electricians and scientists on the remarkable Electrical Exposition which took place in Paris. We had no time to think then, so to speak; our minds were kept busy enough through our eyes in taking note of practical facts, in glancing at old forces revealed under a new light. This grand display of the world's inventive genius furnished food for thought to many, and material for reflection to many more, the results of which have become apparent already. During the year 1882 these indefatigable workers and thinkers have been pursuing their tasks side by side, the former vying with each other in exertion in the path of improvement and perfection, the latter seeking to classify the facts they had gathered and to refer them to their proper causes. Thus, though it may be true that we cannot add to the list many great new principles or many great inventions, yet we must ascribe to this year a good share of importance. In one sense it has been the supplement of the previous year; in another sense it has been its complement, for it is during this year that we have realized what we really learned the previous year.

Perhaps the crowning achievement of the present year was the discovery of the principle of the conservation of electricity. A century ago, the physicist called to his assistance in explaining natural phenomena the theory of the conservation of matter. To his mind, that matter was indestructible was a necessary postulate of the great principle of economy in nature. A half century later the physicist in analyzing the forces of nature is forced to admit there also the same principle of economy, and to proclaim another law, that of the conservation of energy. To-day we go a step farther; a French savant, M. Lippmann, and an English physicist, Mr. S. P. Thompson, show us that one of these forces—electricity—is present in the universe in constant quantity. This astounding revelation leads the mind to look ahead and anticipate a step farther. Is this conservation of electricity only the first link of a coming generalization for all the forces? We know already that with matter the elements are each individually indestructible, or in other words, that there is a conservation for each of these elements. Are we going to learn now that there is a conservation of each force individually also? It is for the other departments of science to answer; and this shows how the advance in one department of science gives an impulse to progress in the collateral branches.

The study of laws and principles has met with attention from other investigators, and the themes which attracted attention in previous years have not been neglected. We have learned some very interesting new facts from those renowned explorers Warren de la Rue and Hugo Müller concerning the discharge of electricity of high potential in vacuum tubes. They have kept adding constantly to their chloride of silver battery, until now it can boast of being the largest battery in the world, having reached the immense number of 14,400 cells, producing an electromotive force so great as to put to a severe test the best means of insulation.

Much as the phenomena of the discharge of electricity of high tension in vacuo have been studied, but little is really known about them, and these scientists have filled a void by their researches. It has long been a mooted question whether a perfect vacuum is a conductor of electricity of high potential or not, and it is pleasing to find them attacking the question with so much earnestness. The evidence which their experiments adduce is very strongly in favor of the negative; indeed it seems almost to settle the question. It remains to be seen what may be said on the other side. They have also investigated the character of the discharge at different degrees of atmospheric pressure, to determine in this way, if possible, the height at which the aurora borealis discharges take place. They find that the point of corresponding low pressure or rarification in the atmosphere would be about thirty-seven miles high, for it is in an atmosphere of such attenuation that the discharge takes on the character of luminous streaks and streamers which we observe in the aurora. This may be a fact that will greatly assist us in ultimately arriving at a plausible theory of the aurora. Their investigations into the character of the discharge and their endeavors to fathom the cause of the luminous striæ and strata produced in Geissler tubes by electrical currents are full of promise for the theory of the mysterious force which we are striving so anxiously to understand. In this relation we should also mention Mr. W. Spottiswoode, who has been continuing his experiments of previous years with his enormous induction coil, which enjoys the distinction of being the largest in the world. He has made an important step in adapting the dynamo-electric machine to his induction coil, by which he obtains much more striking effects, and obviates all the inconveniences and disadvantages of batteries. About two years ago Mr. E. H. Hall, of the Johns Hopkins University, described some experiments leading us to question with him the accuracy of Clerk Maxwell in saying that the mechanical force which urges a conductor carrying a current across the lines of magnetic force acts not on the electric current, but on the conductor which carries it. Mr. Spottiswoode comes to the rescue of the great master with some very interesting experiments on the nature of the discharge of currents in magnetic fields, and he finds in these enough evidence to satisfy him that Maxwell's statement is correct. He finds that the deflection of a spark in a gaseous medium or in air, owing to the power of a magnetic field, can be exactly reproduced when the magnetic field is replaced by a blast of air to swerve the heated air carrying the electricity. He contends, therefore, that the magnet acts on the heated conducting air, rather than on the current passing. We cannot regard this argument as conclusive, but nevertheless we feel bound to appreciate the services which Mr. Spottiswoode, whose fame is already established, has rendered in helping to elucidate such an important point by the new facts which he has brought to light.

The famous experiments of Prof. Crookes on radiant matter have also received considerable attention. We had almost all accepted the views of Prof. Crookes, in regarding the phosphorescent effects obtained in vacuum tubes of high attenuation as due to a so-called fourth state of matter—the radiant state. But later observers now question this conclusion, and among them Mr. J. Pulej, who claims the effects to be nothing more than the results of particles of matter detached from the electrodes, as he shows by covering them with chalk. He finds that the particles become transferred from the positive to the negative plate, where they shine with a peculiar glow, some of these particles also covering the inner surface of the glass with a fine mist of light. He suggests that the yellowish layer which appears on the negative poles is due to a film of oxide of the metal which has been deposited there by the current. These experiments are of the greatest theoretical interest, and it is hoped they will be pursued with still more earnestness. Mr. Pulej almost brings us to the conclusion that we have in this case a kind of electrolysis, so to speak. We have always found solubility to be one of the requisite conditions necessary to the electrolysis of any substance; but this makes us hesitate and wonder what rôle electromotive force itself can play in these phenomena.

The views of Mr. Pulej at least suggest an analogy with the voltaic arc, where we have recognized long ago this phenomenon of transfers of particles from the positive to the negative poles. He literally opens a new field of inquiry where others may search with the certainty of finding much that is new.

The theory of electro-magnetic phenomena has also received considerable attention during the past year. There are many experimenters and observers who are zealously working in this field and analyzing facts in a thousand ways to discover their explanation. Of these interesting phenomena of electro-magnetism and induction which form the key-note of all the industrial uses of electricity we know about everything—except the *why*. We can apply these phenomena with skill and precision, and benefit by the result; but ultimately, when that inward instinct of inquisitiveness prompts the questions, "Why is it?" "What is it?" we have to confess our ignorance, hoping strongly that it may not always be so. And perhaps not; for we can even now catch a glimmering ray of light in this obscure quarter of the theory of electricity. A year ago Dr. Bjerkness, in Paris, showed some most interesting analogies that seemed to promise a quickly coming answer to these questions. It was interesting in the extreme to the electrician to see him illustrate by means of waves, currents and eddies in water, the phenomena of attraction and repulsion, which we are accustomed to witness in magnetic fields. When Professor Guthrie discovered, several years ago, that a vibrating tuning fork possessed attractive power, our minds thought to perceive therein an analogy, but we failed to explain the phenomenon itself, and so it passed out of memory. During the present year, Mr. A. Stroh, in England, has called it to mind again, and given it new interest. Mr. Stroh has been repeating Bjerkness' experiments by means of vibrations in air, and with wonderful success. We were familiar with the lines and figures produced by sand sprinkled on vibrating plates, but now our interest is doubly excited after we have seen him make these lines assume the very forms and shapes that the lines of iron filings in magnetic spectra assume, because we feel, naturally, that a relation of cause must exist between two effects so similar. We feel that the problem has become simplified, and we no longer despair of finding out the why and wherefore.

Such is, in brief, the work which we can place to the credit of the year 1882. But it is not alone in the domain of the physicist that electricity has improved; for the pursuit of that theory which is of more immediate value as the colleague or twin sister of practice has not been forgotten. The year has been remarkable for the immense growth of interest in electrical measurements which it has witnessed. Let us go back only a year or two and the meeting of a congress of electricians to discuss the question of definite units of measurement would have had hardly any interest to anybody except the physical student. To-day it is hailed with pleasure and its work followed with widespread interest. In this respect the year 1882 records an important step forward from empiricism to rational practice. It is pleasing to see that we have almost passed by the era of guesswork which has characterized the years preceding, especially in that all-important field, electric lighting, where electrical engineering seemed to delight in shunning theory and in parading as eminently and purely practical. We have found out that practice cannot afford to discard or even neglect theory, and now we begin to give the latter some consideration. We are beginning to look upon applications more as the consequences of principles than we did, and we are quite prepared to concede that the more thorough a knowledge of them is the more "practical" the applications must be. The electrician now studies his work while doing it rather than after it is done for he finds that after all there is something in Ohm's law and Lenz's law that he should respect and obey in order to obtain the best results. He examines the relations between the different parts of his machines, and he is provided with accurate instruments for making the observations he desires. In short, he knows the value of measurements, and he has learned how to make the measurements. Where there would hardly have been a use for volt-metres, am-meters, ohm-metres, erg-metres, two years ago, there is to-day a brisk demand. This shows plainly how much theory has increased in value. In this connection, we cannot refrain from mentioning the names of Professors Ayrton and Perry, already so widely known. To their efforts we owe the production of measuring apparatus of the greatest accuracy and convenience. They have been, in a measure, pioneer theorists for the practical science, and the untiring attention which they give to the analysis of every fact bearing on practice deserves much commendation. Every detail in electric lighting has met their attention, and received some word of explanation as to the best modes and conditions. They have studied the transmission of power also, under many a phase, and have shown us an important point, namely, that the mechanical resistance or load put on an electric motor and the consequent speed at which it can rotate greatly influence the question of economy; that with greater loads and less speeds, a larger proportion of energy is wasted in heat-

ing the wire coils. This, of course, is a most important fact, the utility of which we will have occasion to appreciate more and more as the interest in the transmission of power revives and grows.

It remains for us to speak of the last, though it is far from the least, item of progress—that in relation to storage batteries. The year 1882 has been the witness of an immense activity in the development of this new feature in the uses and applications of electricity. Hundreds of searchers have been tilling this field, some of them with success, others with but slight encouragement. There is a division of opinion on the question, some being enthusiastic in expectation and believing in great possibilities, while others are full of disappointment and very skeptical as to practicability. It is certain that the secondary battery has not yet fulfilled the promises and satisfied the high hopes entertained of its future; whether it will do so before another year remains to be seen. We believe it will retrieve its reputation to a great extent. The fact is, we are not yet thoroughly conversant with the fundamental principles of the subject. We have been all following the same groove, as if therein were the only possibility of success. Then again, perhaps, we have been expecting too much from them, and will be compelled to be satisfied with such results as they will produce in their present imperfect condition. It is too early to decide. However, we have confidence in the secondary battery, we believe it is destined to fulfill a mission, wherein it will be oftentimes the main factor of possibility; and while we are obliged to herald it now as only a straggler on the march of progress, we hope and we believe it will soon vindicate itself and reach a higher place.

A GREAT deal of interest is manifested in Europe in the result of the Edison Electric Light Company's experiment of district lighting in New York. We notice that a French contemporary has gone to the trouble of sending a cable dispatch to a gentleman of this city, asking for the facts in regard to the reported "hitch" in the progress of the system. Some weeks ago we published an account, given by Mr. Edison to a reporter, of his having overcome an unforeseen difficulty, namely, that of getting the engines and dynamos to work together at a uniform rate of speed. It appears that while Mr. Edison overcame the difficulty to the extent of keeping all the lamps supplied with the electric current, so that there has been no interruption in the service anywhere, it has by no means been overcome in an economic sense, and the president's report guardedly but significantly says: "In this respect we have experienced no little disappointment." Up to the present time no remedy has been found for the trouble, which was fully described in the article above referred to, but it is reported that the company intends to make an entire change in the engines. So far as the electrical portion of the system is concerned, everything has worked satisfactorily, and we do not think that the mechanical difficulty mentioned is sufficient to justify an apprehension of the failure of the system. The history of the steam engine itself shows how apparently far more insuperable difficulties were overcome before it attained the degree of excellence which it now exhibits in our fast locomotives. As will be perceived by comparison of our stock quotations for a few weeks past, the trouble has caused a decline in the quotations of the company's stock from 500 to 375, but it should be borne in mind that the latter is still a very high figure, and one that indicates a strong confidence in the ultimate success of the company. Of the light furnished by the company there is but one opinion among those who are using it—that it is in every way superior to gas. Unfortunately, the trouble with the engines has rendered it impossible, thus far, to settle the important question of the ultimate price at which the light can be furnished. Everything is yet in the experimental stage, including the method of ascertaining the quantity of electricity consumed by each subscriber. It would be premature, therefore, to pronounce upon the success or want of success of the district system. All that can be said at present is that electrical experts have confidence in its ultimate success.

IN most businesses there is a season of especial activity. In the newspaper offices it commences in the latter part of November and continues until February or March. The months of the greatest "rush" are December and January, as it is then that a large proportion of subscriptions are renewed and new ones added. THE OPERATOR has been growing so rapidly in popular favor that every year several thousand additional subscribers are added to the list; which, of course, proportionately increases the work of the office. At no former time, however, has the increase in subscriptions and clubs been anything approaching what it has been during the past two months. The excellence of the paper, the low subscription price, and the special club rates have all combined to secure us an unexpectedly large, though exceedingly welcome and gratifying, influx of subscriptions. This, the change to a weekly, and the improvements recently introduced, have fully doubled the amount of labor involved in conducting the paper. We deem this explanation necessary at the present time, because the extra duties devolving upon the publisher during the past few months have necessitated his delegating to others, partially or wholly, work which he was formerly able to attend to personally. The same cause has also delayed his giving the attention they deserved to several matters—including some additional improvements in the paper—which he hopes to take up in the near future. The many esteemed friends who have sent in clubs or performed other similar services for us, will please accept our grateful thanks, though for the present only tendered in this cold and general way. If any have not received the attention they deserved—if they have made inquiries which have not been satisfactorily replied to—if they have any complaints to make or suggestions to offer, we shall be glad to hear from them now, and will endeavor to remedy or set right anything which in the rush may have been overlooked or neglected.

SHOULD we say *telegrapher* or *telegraphist*? Popular usage inclines to *telegrapher*, of which we have instances in the titles "Telegraphers' Mutual Benefit Association," "Brotherhoood of Telegraphers;" but the word is not sanctioned by lexicographers, who give *telegraphist* as the correct word. The popular preference for *telegrapher* seems to arise from an impression that it is required by analogy with such words as photographer, stenographer, geographer, etc., but this impression is misleading. A well-established rule requires the termination *ist* to be employed in nouns signifying an operator upon an instrument or mechanism, from the name of which the noun is derived, as in machinist, violinist, microscopist, telephonist. The word telegraphist is a substitute for the awkward term "telegraph operator;" it signifies one who operates the telegraph, and analogy therefore, as well as the authority of the lexicographers and standard writers, requires the termination *ist*. Telegraphist is the only form used in England; in French it is *télégraphiste*; in German, *telegraphist*; in Italian, *telegrafista*.

THE burning of the Western Union telegraph office in Detroit, and the narrow escape of the operators from a terrible death, should serve as a warning to call the attention of telegraph companies to the importance of providing adequate means of escape in similar cases. As a rule, the telegraph operating rooms in our large cities are on the uppermost floors of tall buildings, and there are many others, besides that in Detroit, having but one mode of egress, which is liable to be cut off just at the time when it is most needed. The fact that there were no lives lost in the Detroit fire was due to the admirable coolness of the staff under the circumstances, and to the efficient aid rendered by the Fire Department, and does not exonerate the company from responsibility for the failure to provide a suitable fire-escape.

APART from the interest attaching to the portraits of the president and secretary of the Telegraphers' Mutual Benefit Association, which we present in this issue, arising from their connection with that excellent institution, the brief account which we give of their lives should be encouraging, especially to young men in the service. It is the kind of story we like to tell—of success achieved by diligent application and by trustworthiness. The story of the late Mr. William Martin, as told in another column, is also an honorable one. Here was a man who, holding only a minor position for years, managed by his straightforward conduct and kindly nature to win the esteem and respect of all with whom he came in contact, both within and outside of the service.

WE publish to-day as the leading editorial a brief review of the progress in electrical science during 1882. In the next number we hope to print an elaborate review of the progress of telegraphy, telephony, electric lighting and other applications of electricity during the same time.

DOES anybody know what has become of Edison's phonograph?

Preparing to Transmit Electricity on a Large Scale.

We have already referred to the work which is being done at the Lower Falls near Rochester, N. Y., by the Brush Electric Light Company, but no adequate idea has been given of the extent and nature of that work. On the summit of the cliff just below the falls on the west side of the river, stands a new brick building 42x100, in which are to be placed twenty-one dynamo machines for the purpose of generating electricity to be used in Rochester for electric lighting. Under this building the company is digging a wheel-pit six feet square, which will have ninety-four feet head, thus furnishing one of the finest water powers in the city. Already seventy-five feet have been dug through solid rock and the work of completing the excavating is being pushed with all possible haste. In the bottom of the pit will be placed two turbine wheels twenty-four inches in diameter and each having over 550 horse power. They are made of bronze and gun metal so as to endure the terrific speed to which they are to be subjected, namely, five hundred and eighty-two revolutions per minute. They will be arranged so that both or each can be run as necessity shall require. At the top of the pit are to be placed two large bevel wheels weighing six tons each. The main pulley will be connected with the machinery in the building with a belt fifty-four inches in width. All the machinery is to be on this extensive scale and the high rate of speed at which it will be run necessitates that it be of the best quality and placed in position in the most skillful manner.

At the bottom of the pit men are busily engaged in excavating. A large steam drill is used which drills one foot into the solid limestone each minute. About one hundred and twenty-five feet are drilled each day. Dynamite cartridges are used, and about twenty are discharged by electricity at the same time. Tons of rock are lifted out, the discharge fairly shaking the earth.

The Brush Electric Light Company has been engaged all the past summer and fall in prosecuting this work, which is being carried on under the direction of Mr. George A. Redman, superintendent of the company. Some of the machinery has been received and will soon be put in position by Mr. Joseph Cowles. Only about nineteen feet more of the rock remain to be excavated, and when all is completed the company will have, it is claimed, the best lighting station in the country.

The Telegraph in New Brunswick.

The first telegraph line in New Brunswick, extending from St. John to Calais, was finished in 1848, by the New Brunswick Electric Telegraph Company. The receipts of the line for the first seven months were $506.89 for messages, and about $800 for press dispatches. Even in 1864 two operators did all the work in the St. John office, where twenty are now employed, and the number of messages passing through the St. John office now averages nearly three thousand a day, of which over six hundred are local messages to or from St. John. Formerly the St. John office was closed at 9 o'clock, now it is open continuously night and day, and also on Sundays. The newspaper business is now a large part of the duty of the St. John office. As many as 25,000 words have been telegraphed in one night by the Western Union to the St. John morning papers, enough to make twelve columns of the smallest type used by those journals.

Up to 1863 all the work done in New Brunswick was done by a single wire. In that year a second wire was strung; in 1868 a third was added, and now there are seven wires running to the United States, two to Montreal, by the river route, one to Fredericton, and ten running east, connecting with the various cables in Nova Scotia and at Montreal, by way of the Intercolonial.

The cable business has, since 1866, been a large feature of the New Brunswick telegraphing. Cable messages are repeated at North Sydney for the Anglo-American cables, at Canso for the American Cable Company and at Tor Bay for the direct U. S. Cable. Four through wires are used for the cable business. All the cable messages for Canada and the United States, east of New York, are repeated in the St. John office, and messages for New York and the West go through automatic repeaters in the St. John office, but are not transcribed. The growth of the cable business has been marvelous, and is every year becoming greater; and no doubt the increase would have been much more rapid had the tolls been permanently put at a reasonable figure. The average number of cable messages now transmitted daily is nearly four thousand.

St. John has now admirable telegraphic facilities, and much of the efficiency of the service is due to the management of the old and experienced officers at its head. Mr. R. T. Clinch and Mr. T. M. Robinson have been in the St. John office for many years, and have assisted in promoting the growth of the business and perfecting connections with the other Provinces and the United States.

CLINTON, IOWA.—Clinton is rapidly developing into a leading telephone centre. The Northwestern Bell Telephone Company of that city has, during the past year, extended its system in every direction. Communication can now be held with the following cities and towns in Iowa: Muscatine, Buffalo, De Witt, Camanche, Elvira, Blue Grass, Durant, Lyons, Low Moss, Princeton, Le Claire, Davenport, Wilton; and in Illinois with Rock Island, Carbon Cliff, Garden Plain, Rock Falls, Spring Hill, Geneseo, Coleta, Milan, Malvern, Cambridge, Albany, Rock Island Junction, Port Byron, Rapids City, Erie, Mt. Carroll, Coal Valley, Prophetstown, Moline, Galt, Sterling, Round Grove, Fulton, Lyndon, Morrison, Fenton, Prairie Center, Cordova, Hampton, Milledgeville and Lanark. During the present year the company intends to extend its lines to Shannon, Florence, Freeport, Savanna, Florence, Thomson, Dixon and other points in Illinois, and to all points in Jackson and Clinton counties, Iowa; also to run a direct line to Dubuque. The exchange offices are at Clinton and De Witt, Iowa, and Morrison, Sterling, Lanark and Mt. Carroll, Ill. Extensive improvements in the system will be adopted and the city lines will be reconstructed in a substantial and durable manner. During the past year the company has strung over 250 miles of wire, and planted several thousand cedar poles. Over 1,200 instruments are now reached from every station. The Exchange Bell Telephone Company has also been organized, with Mr. H. D. Root as general manager. It will operate in Southern Iowa. The Iowa Electric Company, of Clinton, has done well during 1882, its fire and burglar alarms, magneto bells and electric supplies having been in demand.

An Anti-Gould Cable Scheme.

A CABLE TO BE LAID BETWEEN NOVA SCOTIA AND IRELAND—ASSURED SUCCESS OF THE SCHEME.

Mr. L. A. Senecal, of Montreal, Canada, who is regarded as being the most enterprising man in the young Dominion, has consummated, says a Canadian journal, or will shortly do so, a great enterprise, which cannot fail, when completed, to add additional lustre to his fame as a successful projector of grand schemes. Some weeks since Mr. Senecal left Montreal for Europe, and was shortly followed by Mr. C. R. Hosmer, president of the Montreal Telegraph Company. Rumors then became current that a great cable project was on foot which would in all probability be a surprise to the Jay Gould combination in the United States, and which would give the Mutual Union the much desired connection, so necessary for its doing an extensive and profitable business. This may now, through Mr. Senecal's agency, be regarded as being an accomplished fact, as a company has been formed in London with a capital of $5,000,000. The stock has been all taken up in London, Paris, New York and Montreal, and the contract given to the Cable Construction Company of London, England, to have the connection made between a point on the coast of Nova Scotia. twenty miles distant from Halifax, and a point in the vicinity of Queenstown, Ireland, by the end of October next. The legislation in the premises, so far as the Canadian Parliament is concerned, it is said, was obtained some years ago, by a charter granted to Mr. H. J. Prentice, who was formerly a stock broker in Montreal, but now is a resident of London. Mr. Senecal, it is understood, has purchased this charter. Mr. Alderman Hadley, of London, a capitalist and future mayor of that city, will probably be the president of the new company. Mr. Hadley is already well known from his connection with several existing cable enterprises, is a warm supporter of the Gladstone government, and is a gentleman who it is said will give great prestige to the undertaking. The proposed title of the company when incorporated is the Anglo-Franco-Atlantic Cable Company. Mr. Hosmer, during his stay in Europe, visited with Mr. Senecal the leading capitalists of London and Paris, and explained the enormous cable monopoly enjoyed at present by the Gould ring, and the prospects which were presented to any new cable company which could obtain an independent connection with the Mutual Union and Canadian Mutual telegraph companies. The result of these interviews can be judged from the statement made by Mr. Senecal that he "could have had all the stock subscribed for in either London or Paris alone, and double the amount if necessary."

Mr. Hosmer remains in London to superintend the construction of the cable, and make arrangements for British, Continental and foreign connections. It is said, however, that after his return to America he will assume an important position in the administration of the affairs of the new company.

Mr. Réné Manzaize is at present in Montreal representing the interests of the French shareholders, but will shortly return to France to report on the prospects of the company in America. The rates of the new company, for ordinary messages, will be twenty-five cents a word, and large contracts have been already promised, extending over a number of years. All the independent papers outside of the Gould clique have promised their support, and it is probable that Mr. James Gordon Bennett, of the New York *Herald*, Mr. Richard White, of the Montreal *Gazette*, and Mr. Garrett, of the Baltimore & Ohio Railroad Company, will be members of the Board of Directors.

The Patent Question.

[*From L'Electricité.*]

In a former number we criticised the practice, common to certain inventors, of patenting a great number of ill-defined principles, with the object of deriving benefit at some future time in case their pretended discoveries should happen to prove of utility.

Some of the American journals, as THE OPERATOR and the *Telegraphic Journal* [*sic*], have taken up arms in defense of their national institutions. We must decline to be convinced by the arguments they advance, though ably presented.

Far from us the thought of discouraging the efforts of those who seek to acquire fortune or renown in the progress of the industrial arts. We believe that this kind of property, which is the most respectable of all, because it is the fruit of labor and success, cannot be too much favored.

But legislators ought to be careful not to discourage real talent, for the sake of the writers of patents, whose sybilline terms admit of a multitude of different interpretations.

The French law, full of wisdom in this matter as in others, very sensibly requires that the description given shall be sufficiently clear to enable an intelligent workman to construct the apparatus for which the patent is granted. The authors of our laws should never be subject to reproach for so wise a precaution.

That which legislators should require is that the patent shall clearly define the limits of the industrial field which it gives the exclusive right to cultivate.

Mr. Frank Bolton, honorary secretary of the Society of Telegraph Engineers and of Electricians, of London, has recently published a classified resumé of the principal electrical patents issued in England during the last three years.

It is sufficient to glance through this work, which contains not far from 600 different articles, to understand the necessity of strictly carrying out a clause which equally protects the rights of all inventors.

Another equally wise provision is that which requires, in order to render a patent valid, that it shall be put into practical use within a reasonable period, so that the industry it represents shall not remain paralyzed for fifteen years by the patent lying in a latent condition.

As well as we have been able to judge from a hasty reading of the principal patents given in Mr. Bolton's interesting work, not one-fourth of the English patents which he has analyzed would now be valid if they were subject to the requirement of being put to practical use within the period fixed by the French patent law. This is not surprising when we reflect that at least half of these patents were still-born and would never have been susceptible of a serious attempt to put them into practice.

At the same time, a glance through this work produces an impression, if not of the fertility of the genius of the inventors, at least of their mental activity. It shows that the problems have been attacked in every way that could suggest itself to the mind.

No path seems to have been left unexplored. There is no strange combination that has not occupied some inventor, often ingenious enough, for a longer or shorter time.

This psychological phenomenon is especially noticeable when we read that portion of this interesting collection devoted to the electric light. Here may be seen a series of patents for lamps in which the two carbons form an angle with the point at the top; a second forthose with the point at the bottom; a third for those in which the carbons are parallel; a fourth for those in which the carbons are placed one above the other; a fifth for those in which they are horizontal; a sixth for those in which the carbons are disc-shaped; a seventh for incandescence in a vacuum; an eighth for incandescence in the air; a ninth for partial incandescence; a tenth with the loops made of refractory materials; then a series of combinations which do not come within any of the preceding classifications, and some of which are remarkable, such as the method of passing the current in the interior of a flame, the projection of pulverulent matter, the use of a current of water to prevent destruction of the electrodes, etc.

Each of these chapters could be subdivided into several paragraphs, which it would take too long to enumerate at present, but of which the details would not be without interest.

The Telephone in England and America.

An English journal, the *Porcupine*, of Liverpool, draws a comparison between the telephone service in that country and in America, much to the disadvantage of the former. "For instance," says the *Porcupine*, "in all Great Britain the total number of subscribers to telephonic exchanges is under 5,000. In the United States there are over 37,000, and something like 50,000 private telephones. Then just imagine a big city like London, with its population of nearly five million souls, having only 1,561 subscribers, while New York, Brooklyn, and Hoboken, with a population of not quite two millions, have 4,060 subscribers. Even Cincinnati, half the size of Liverpool, has 233 more telephonic subscribers than the capital of the world Glasgow has 600 subscribers, Chicago 2,726. One town in Colorado, Denver, with the population of a petti-fogging provincial town—some 35,000 souls—has more subscribers than any English city except London. But then it is not difficult to account for this strange discrepancy. In America you can have as fine a telephone as any in the world for $2½ to $3½ a month, or an average rate of about £8 8s per annum. Here is food for reflection! The telephone companies on this side of the Atlantic have yet to learn the lesson Rowland Hill taught our postal authorities. They prefer the pounds of the upper ten to the pence of the million. But the Yankees are wiser in their generation. They offer every facility for the poor man to use their lines. Telephone message tickets are sold in packets. You can buy them as easily as postage stamps, and they are as salable. In many parts of the States you can make use of the telephone for a few minutes at a merely nominal charge, stepping in, addressing your friend two miles off, making an appointment, and paying 15 or 20 cents for the privilege. The wonderful part is that this tremendous influx of telephone business has not damaged the telegraphic companies to the extent of a single appreciable cent. The following details, which have been kindly furnished to us by Messrs. George Angus & Co. of Liverpool, Newcastle, and New York, seem to indicate that the telephonic service in Liverpool requires development:—

640	Liverpool Subscribers pay	£20	a year—	hours 8 a.m. to 6 p.m.
400	Dublin "	£ 2	"	" 9 a.m. to 6 p.m.
200	Leeds "	£12	"	" all day and night, Sundays included.
200	Newcastle-on-Tyne "	£14 10s.	"	all day and generally all night; which will become regular when 300 subscribe.
250	Edinburgh "	£ 5	"	8 a.m. to 9 p.m.
114	Birmingham "	£15	"	9 a.m. to 6 a.m., all night service shortly.
30	Wolverhampton "	£15	"	9 a.m. to 6 p.m.
1,000	Glasgow "	£20	"	open day and night.
167	Sheffield "	£20	"	9 a.m. to 7 p.m.
880	Manchester "	£20	"	open day and night.
220	Bristol	£15	"	all night."

The Western Union Office in Detroit Destroyed by Fire.

A dispatch from Detroit, dated Jan. 8. says: Fire broke out this evening at the foot of the elevator in the telegraph block, evidently in some rags kept there for use around the elevator. The fire communicated with sweepings, and almost instantly flames shot up the entire length of the elevator to the roof of the building. In the top story are situated the large operating room of the Western Union Telegraph Company and the superintendent's office, bookkeeper's rooms, and battery rooms. The night force of operators had just got to work when the alarm was given, but so instantaneous was the progress of the flames that all egress by the stairway was cut off. The night chief operator, Mr. M. S. Corbett, at once rushed to the ladder leading to the scuttle on the roof and called upon others to follow him, but the scuttle was closed. Mr. Corbett had on a thin office coat, which took fire as he mounted the ladder, and before he could divest himself of it he was severely burned on hands, arms and face. So fierce was the fire even at this early stage that egress by the roof was cut off. The operators then retired to their room, separated from the passage way and other parts of the building by a brick wall. Closing doors tightly they patiently waited for deliverance to reach them as best it could. The Fire Department responded with great promptness, and soon three steamers were at work pouring water into the upper stories, while the hook and ladder corps bent their every energy to rescue the imprisoned operators, some twenty in number, including one girl. The operations were greatly interfered with by the multiplicity of wires crossing the streets in every direction. Finally a ladder was put up, and reached to the next story below the operating room. Men were exhorted to drop from the window and take chances of catching hold of the ladder, but fortunately they refused to do so. At this time flames were roaring beyond the partition wall and bursting through the roof, casting a lurid glare upon the buildings three and four blocks away. The firemen, with redoubled energy, set about getting up another larger fire-escape, and succeeded in doing so, reaching the top story and safely delivering men from a position which was becoming every moment more critical. As the operators came down the ladder they were greeted with wild cheers by the excited and surging crowd that thronged the streets below. Attention was now given to confining the flames within as narrow a limit as possible. Additional steamers were summoned and floods poured into the upper stories, but so rapidly had the flames spread and so fiercely did they burn that it took an hour's steady work before they were got under control. Fortunately the evening was perfectly calm and the fire was confined chiefly to the upper stories. The lower floors, occupied by the People's Savings Bank and various business offices, were flooded with water, and the adjoining block was slightly damaged by fire and water. It is difficult to estimate the loss, but it is not heavy, perhaps $20,000. The telegraph company at once opened communication through railroad and other wires, and will speedily be in shape again. As the poles are not disturbed new office connections alone will be required.

Improvements in the Lowell (Mass.) Telephone Exchange.

The growth of the business of the Lowell exchange has made necessary the enlargement of the quarters and the introduction of improved switch-boards. For the past three months, under the direction of Special Agent Derby and Superintendent Sanborn, the work of removal has progressed, and in its new quarters, over the former operating department, an exchange system is in operation which is claimed to be a model.

The wires are run in cables from the tower to the switches, replacing the net-work, always troublesome to the experienced eye. The switches, eleven in number, face the windows, and are of the Williams improved pattern. Each switch is designated by a letter, and the connecting bars throughout are correspondingly lettered and numbered. Heretofore calls have required the work of two operators before communication has been established. The subscriber signaling dropped an annunciator calling the operator's attention, the circuit was switched by a cord connection into a table where the want was made known, and party desired was signaled and another switch-table connection made. This made extra work and required time. Now the annunciator signal is answered and connection made by switch direct. The trunk line table, requiring the attention of two operators, is the termination of lines reaching out to cities and towns throughout New England. Through this switch over three hundred connections are made each day. The managing operator is stationed at a desk in the centre of the inclosure and has each switch in available communication, for the purpose of giving orders, explaining "trouble" and overlooking the office affairs in general. The company employs an operating force of four men and eleven female operators, having in exchange connection over nine hundred subscribers.

The Attack on Western Union in Pennsylvania.

Argument on the petition of citizens of Pennsylvania asking that the Attorney General file a bill in equity with the Supreme Court against the Western Union Telegraph Company for an alleged defiance and violation of the Constitution and laws of the State was begun before Attorney General Palmer on Jan. 5.

Mr. Silas W. Petit, of Philadelphia, opened the argument in behalf of the petitioners. He said that it was a well-established law that a corporation in one State can only exercise its franchises in another State by sufferance and invitation, and not by any constitutional provision. "I take it," he said, "that the Attorney General of Pennsylvania will not decide that a telegraph company incorporated by the State of Texas or Maine can come into the cities of Pennsylvania and erect poles and string them with wires in utter disregard of the laws of the State. It has been said that the Western Union Telegraph Company is beneficial in the fact that it constructs public necessities. I say it does not construct, but lets other companies construct, and as soon as they reach competitive dimensions it buys them, in utter violation of its powers. The constitutional provision pointedly says that 'no telegraph company shall consolidate with or hold in any other competing company any stock or interest by purchase or otherwise.' Therefore, as the constitutional provision precludes buying it must preclude selling to a competing line, as two parties are necessary to a sale, both parties holding corporate powers. I, therefore, hold that the sale or purchase of a competing line is a direct violation of the Constitution. The sale or purchase is admitted by the Western Union, and the law is plain and needs only enforcement, as the Western Union is not a corporate citizen of Pennsylvania, but of New York. We can supply our own means of communication if need be."

Mr. Petit was followed by General Swayne in behalf of the company. General Swayne held that the small corporations referred to were no practical good to the people, and unprofitable to their owners, and the Western Union Telegraph Company was serving the public by buying the corporate rights and making them of value. General Swayne said that the New York company had given to the State of Pennsylvania cheaper rates and better facilities than could otherwise be gained. It was with a view of paralyzing this that this movement was instituted. The acts complained of were authorized by law, and have been of great benefit to the people of Pennsylvania. General Swayne argued that the lines of the company were so necessary and of such vital importance to the people of the whole United States that to deprive the public of their use would be to paralyze business interests and cause serious injury. The right of coming into the State, he asserted, was granted to the company by Congress through inter-State commerce.

Mr. Benjamin Harris Brewster spoke very briefly for the company. He insisted that the company had a right to have a party as complainant in this matter. They came here to meet those who, it is alleged, have been aggrieved, but they did not find them.

The alleged complainants may be foreigners. The aggrieved should be Pennsylvania subjects, none others. The Constitution, he admitted, prohibited the consolidation of competing telegraph companies, but at the same time it left the penalty and method for a violation to the Legislature. That body, he said, had not provided a penalty, and consequently without an existing remedy there could be no action.

Mr. Samuel Dickson, of Philadelphia, followed for the plaintiff, and cited a great many cases to substantiate the position taken by Mr. Petit. He read the testimony of Norvin Green, president of the Western Union Company, to show that the object of purchasing the American Union was to get it out of the way as a competitive line.

Mr. John K. Reed, of Philadelphia, closed the argument for the plaintiff by reading a paper signed by a number of citizens of Philadelphia, to show that the assertions of Attorney General Brewster relative to there being no plaintiff in the matter was not well founded.

Attorney General Palmer took the papers and reserved his decision.

Canadian Notes.

Montreal Telegraph Company's stock is quoted in Montreal at 124. The annual meeting of shareholders, for the election of directors, was advertised to take place Jan. 11.

Mr. O. S. Wood has given fifty dollars to the Montreal Board of Outdoor Relief, and a similar amount to the Protestant House of Industry and Refuge.

The choir stalls in Christ Church Cathedral, Montreal, are to be moved nearer to the congregation, and it is proposed to connect the key-board to the organ electrically.

The Fuller Electric Light Company has given notice of intention to apply to the Canadian Parliament for an act of incorporation. The Fuller light has been exhibited successfully in Montreal, especially at the Windsor Hotel, and has found much favor.

It is currently reported that the Edison Electric Light Company proposes to make Toronto the headquarters of its Canadian branch. This will be a good move, as the Western people promise to push the light when it is properly introduced.

Preparations for the winter carnival, which begins at Montreal on the 24th instant, are in an advanced state. The ice palace in Dominion Square is to be a gorgeous affair. The centre tower will be 120 feet in height. Forty thousand feet of ice will be required for the structure. The interior, as well as the exterior, will be brilliantly lighted by electricity.

The Railway Telegraphic Temperance Association, at a recent meeting held at St. Hyacinthe, elected the following officers: President, Mr. W. B. Lanigan, St. Dominique; vice president, Mr. James Hurly, Acton Vale; secretary, Mr. A. G. Potts, St. Madeline; treasurer, Mr. Joseph Boyd, St. Hyacinthe; chaplain, Mr. J. B. Brown, Acton Vale; director of ceremonies, Mr. J. Coughlin, Union.

The clerks of the receiving, delivery and entry departments of the Great Northwestern Telegraph Company at Montreal, made a New Year's presentation of a handsome service to Mr. W. J. Graham, the popular and efficient manager of the office in that city. Mr. Graham has been in the employ of the company for the past 28 years, which of itself shows that he is "the right man in the right place." The presentation speech on behalf of the staff was delivered by Mr. A. Watson, who is also a much esteemed employé of the company.

A Postal Telegraph Bill Introduced.

Mr. Anderson, of Kansas, introduced into the House Jan. 8, a bill to create the Postal Telegraph of the United States. The bill provides that the Government shall issue bonds to the amount of $3,000,000, redeemable in twenty years and payable in thirty years, and that at the expiration of ten years there shall be set aside from the earnings of the telegraph line $300,000 a year, to form a sinking fund for the payment of the bonds. The bill provides that there shall be a uniform rate of twenty-five cents per message of ten words or less, and twenty-five cents for every additional ten words. It contemplates that there shall be a telegraph postal office at every post office where there is a carrier system, and that there may be one at any office where the postmaster can give a sufficient bond to cover any amount which the office may fall short of meeting the expenses incurred on account of the telegraph. The telegraph line contemplated in the bill is to run from Portland, Me., to Topeka, Kan., with branches to all principal cities between the longitudes of these points. The provision allowing smaller post-offices to have the telegraph postal service on the condition that what each office lacks of paying expenses shall be secured by a bond given by the postmaster, applies only to offices near the lines provided for. The control of the postal telegraph line is to be under an officer of the Post Office Department, to be known as the supervisor of the Postal Telegraph.

The Action of Microphones.

Referring to the letter of Mr. J. D. Smillie on this subject, of which we gave an abstract last week, a correspondent of the London *Electrician* writes:

"The peculiar action of the microphone, as explained by Professor Hughes, is due to the varying pressure, and, consequently, varying electrical resistance, caused to exist between two conductors, lying in slight or loose contact, by agitation in the medium surrounding them. Professor Blyth has amplified this explanation, not contradicted it. He has proved that one conductor may jump slightly clear of the other; but, inasmuch as a current is passing between them at the time, electrical communication is not broken, owing to the formation of a minute arc, or a number of minute arcs, simultaneously with the momentary interruption of the contact. He illustrates this fact by means of an experiment—that of a continuous arc due to 20 Grove cells—which has earned the ridicule of Mr. Smillie, but which is not the less instructive on that account. What does your correspondent do to prove his assertion that microphonic action is due to compression of the carbon and not to variation in the resistance of the contacts? He takes a microphone, the conductors of which are pressed together with a force of 45 grains. He blows upon it with bellows, and tickles it with a bristle plucked from a broom, thereby causing one of the conductors to press against the other with a force greater than 45 grains. What happens? Precisely what Professors Hughes and Blyth tell us—*i. e.*, the resistance of the contact between the conductors is diminished. He ceases to blow, and to tickle, and lo! the contact re-acquires the resistance proper to a pressure of 45 grains. Is there in all Mr. Smillie's three columns one iota of proof that the carbon was compressed? Not one. Let Mr. Smillie remove the carbon button from his Blake transmitter, and replace it by a metallic button. Let him bring his platinum stud against the button gently, so that the current from a No. 2 Leclanché will just pass, and no more. Then let him blow upon and tickle his diaphragm as before, and inform you, Mr. Editor, whether he thinks the diminished resistance which he will observe *is still due to the compression of the carbon button.*

"I do not know whether the remainder of the letter is worth reviewing; but it is amusing to note with what innocence Mr. Smillie publishes his four 'deductions' as though they had not—the first, of course, excepted—been perfectly well known to every telephonist since 1878; and how completely he must have misunderstood Professor Blyth's paper when, in the last paragraph, he attributes to him an intermittent contact—*i. e.*, make-and-break-theory."

Portland, Maine, Notes.

The Portland Electric Light Company occupied its new building for the first time on New Year's evening. The company has one of the best equipped places of its size in New England. The building is 30 by 40 ft., two stories, brick. An automatic cut-off Buckeye engine, with a driving-wheel of 8 ft., furnishes the power, with two 60-horse-power boilers, six dynamos, and as many more to be put in as soon as finished. All the electrical apparatus is of the Weston and Maxim patents. The Portland Arnoux Company will move into the new building erected for it, next week. The capacity of the two companies is 300 lights.

The operators in the telephone office presented Messrs Farnham, the superintendent, and Lincoln, the chief operator, with a gold pen and holder, each, as Christmas tokens.

The patrons of the Western Union office presented the twenty messengers of the office with an aggregate of $150, in response to the New Year's calls of the boys.

The Portland & Rochester Railroad depot is now lighted by the Arnoux light, being the last railroad depot of the five in Portland to adopt it.

The Mutual Union Telegraph office has done a third larger business during the year just closed than any other opposition office ever opened in Portland.

Mr. M. P. Devine, for a long time night clerk of the telephone exchange, is now with the Portland Wesotn Light Company.

The Proposed Universal Morse Alphabet.

To the Editor of the Operator and Electrical World:

SIR: As "G. O." seemingly fears that operators might find difficulty in acquiring familiarity with the "Universal" Morse alphabet, as proposed by "Sa," allow me to relate some of my experience, in the hope it may allay any doubt in that respect.

About 20 years ago my brother and myself had charge of a Morse office in a city of 60,000 inhabitants. A Bain line took quarters with us. Business not being as enormous then as now, we amused ourselves by answering the calls upon the Bain wire, and found that we could not only reply, but send and receive messages within such a short space of time as to be simply amazing. The Bain operator departed and we took charge of his line along with our own and worked them both with as much ease as that with which a linguist changes from one language to another in conversation. Besides this, we astonished the Bain folks by our rapidity in transmiting.

Let me state here, that I am slow in learning, and consequently cannot lay any claim to being unnaturally smart.

Some time afterward we were stationed at opposite ends of Morse lines, and then we gradually realized the immense importance of an alphabet without spaced letters, such as Bain's, as compared with the Morse, for the correct transmission of words containing spaced (Morse) letters, foreign words or cipher messages, or when wires were working badly. This knowledge was of great comfort to us at times and enabled us to send messages accurately by the use of Bain, when otherwise there would have been some doubt on that point.

Taking all things into consideration, I fail to perceive where any additional length of time would be required in getting through a given amount of business under the proposed "Universal" Morse alphabet, as compared with the present one in use.

Trusting this will strengthen all doubting minds as to making a change that is so much needed, I am, etc.

NEW YORK, Jan. 4, 1883. NI.

"Ghostly Manifestations."—An Explanation Offered

To the Editor of The Operator and Electrical World:

SIR: Referring to the communication of "P. M." in the Dec. 30th issue of THE OPERATOR, I would like to publish a similar experience; perhaps it would have a tendency to remove the cloud of mystery which seems to have enveloped a brother operator. I have been an operator for several years, and a great part of my time has been devoted to the study of electricity, and I can say from experience that I have never seen an electrical phenomenon that could not be traced to a natural cause, either directly or indirectly. When I first took charge here as "day man" I could notice a peculiar "humming" of the wires whenever my relays were still. One evening I heard very plainly the "grumbling" sound which is characteristic of a poorly adjusted relay. I wound up both relays and soon found no one was using either wire. I found that by placing my ear on the table I was able to hear office calls which I knew were not on either line that came into my office, and was also able to copy a message which I heard in the above manner. It was by being able to copy the message that the mystery was, in a measure, solved. The message was sent on a wire which was connected with instruments on the same table that one of my wires was connected with, over 50 miles away from me. I found that by opening my key I could cause all sounds to cease except the natural "hum" of the wires.

I think if "P. M." will investigate from a theoretical standpoint he will be able to trace home the true cause of the "ghostly manifestations."

It would be an easy matter for him to interview the operators at terminal points or elsewhere and see if he cannot find a line that connects to the same table through which his line passes, and if I am not sadly mistaken he will find an "H" somewhere. Having given him a "pointer" in what I believe to be the right direction, I would be pleased to hear from him through THE OPERATOR AND ELECTRICAL WORLD how he succeeds. S.

JAN. 4, 1883.

[Similar effects are sometimes observed where two or more lines work from one battery, even when the lines go in opposite directions.—ED.]

THE POWER OF POETRY.—Mrs. J. R. Keene gave $20 to the Western Union boy who carried a New Year's greeting to her at Newport.

Richmond Telegraphic Notes.

To the Editor of The Operator and Electrical World:

SIR: The force in the Western Union office consists at present of Mr. J. B. Tree, manager (also superintendent of this district), Messrs. F. D. Cudlipp, chief; L. A. Angel, J. H. Allen, Jr., John Burnes, M. F. Burke, Wilmer Padgett, Burt Rowe and W. L. Wright, day operators; W. C. Walstrum, chief; Mack Budd, Philip T. Cudlipp and W. T. Mobley, night operators.

During the holidays our popular book-keeper, Mr. A. C. Stevenson, was married to Miss Lee Montgomery, of Richmond, and started on a bridal trip North. His associates wish Mr. and Mrs. Stevenson a happy and prosperous life.

Since the sudden death of Mr. R. M. J. Paynter, Mr. J. W. Kates has been discharging the duties of manager of the Southern Telegraph Company's office. His force consists of Messrs. Geo. Harrison, Joseph Marshall and Joseph McGovern. I understand they are doing a nice business.

Mr. Bogardus (Bogy) spent Christmas week here. He says he was thrown out by the removal of the Western Union relay office from Lake City to Jacksonville, Fla. He is making his way North. OCCASIONAL.

RICHMOND, Va., Jan. 6, 1883.

A Reception at Hornellsville.

To the Editor of The Operator and Electrical World:

SIR: The Hornellsville telegraphers' second annual reception will take place at the Metropolitan Hall, Hornellsville, N. Y., on Tuesday evening, Feb. 6, Beman's orchestra of Binghamton, N. Y., being engaged for the occasion.

The following are the committees:

Honorary.—Messrs. W. J. Holmes, W. B. Coffin, O. A. Slocum, C. Neilson, B. P. Humphrey, R. B. Gable, C. C. Scott, A. W. Dewitt, and A. E. Brown.

Executive.—Messrs. O. A. Slocum, C. L. Pasho, C. R. Wescott, H. M. Frank, W. J. Clark, E. W. Hempstead, F. R. Rockwell, W. H. Thompson, H. W. Ford, P. A. Lord, D. C. Yost, L. B. Brace, L. N. Taft, and Miss M. E. Crowell.

Reception.—Messrs. W. H. Thompson, H. W. Ford, L. N. Taft, C. L. Pasho, H. M. Frank, L. B. Brace.

Floor.—Messrs. P. A. Lord, F. R. Rockwell, E. W. Hempstead, C. R. Wescott, D. C. Yost.

Badges.—Miss M. E. Crowell.

Treasurer.—Mr. C. R. Wescott.

Manager and Secretary.—Mr. D. C. Yost.

HORNELLSVILLE, N. Y., Jan. 9, 1883. Y.

The Montreal Telegraph Company.

The report of President Andrew Allan, presented at the annual meeting on Jan. 11, shows the rental received from the Great Northwestern Telegraph Company for fifteen months ending Dec. 30, 1882, to have been $206,250, from which five dividends of $40,000 each have been paid. The balance, $6,250, is charged to maintenance. The president's report says:

"Considering the short period which has elapsed since the company entered into the agreement with the Great Northwestern Telegraph Company, it was deemed by the board unnecessary to incur during the past season the expense of an examination into the condition of the property transferred in terms of the agreement. It is intended, however, to engage from time to time the services of an expert or experts to examine thoroughly the various lines and other property belonging to the company. It is probable this work will be initiated and a great portion of it accomplished during the coming summer. In the meantime, we are assured by the general manager of the Great Northwestern Telegraph Company, that all has been done during the past season that was possible to do, to improve the lines of the Montreal Telegraph Company. A large amount of rebuilding and repairing has been accomplished—poles straightened up and defective insulation remedied. Offices have been overhauled in the most thorough manner over a very large portion of the lines, and new and improved instruments put in. The Toronto offices have been overhauled at an expense of several thousand dollars, and plans are being made for the remodeling of the offices in Quebec. Preparations are also being made for next season to continue the work of improvement, with the view of placing the lines in the very highest state of efficiency.

The case of Low against this company and the Great Northwestern Telegraph Company is still pending in Appeal and has not yet reached a hearing in that court. There is, therefore, nothing new to report to the shareholders with reference to this case since last meeting.

The directors record, with much regret, the removal from their midst by death during the past year of Dr. Geo. W. Campbell and Sir Hugh Allan. The former was a member of the directorate for eighteen years, the latter for thirty-five and president of the company thirty-one years."

THE ELECTRIC LIGHT.

EFFECT OF THE COLD SNAP.—"It's an ill wind that blaws naebody good," was doubtless the thought of Mr. Akester the other afternoon, as the Glasgow merchant hurried into his office and asked an immediate installation of the electric light, as his gas supply was completely stopped by the severe frost. The request was complied with, and by 5 P. M. the shop was brilliantly lighted up. The occurrence has already brought business and is expected to lead to more shortly.—*Electrical Review.*

A LINEMAN'S MALICE.—Thomas Drum, a telegraph lineman, residing in Jersey City, was arrested on Jan. 6 on a charge of malicious mischief, preferred by Mr. William Baxter, president of the Baxter Electric Light Company. It is alleged that Drum stood on a Grove street awning and tied the wires of the Baxter Company to the wires of the New Jersey Telephone Company by means of a woolen scarf, throwing the streets of the city that were lighted with electricity into darkness, and damaging the instruments of the telephone company.

HOW THE ELECTRIC LIGHT HELPS THE GAS COMPANIES.—The Philadelphia *Times* has made the discovery that the partial abandonment of gas for the electric light in its establishment has caused an increase of 13 per cent. in the amount of gas consumed—or charged for. In December, 1881, when gas was $2 per 1,000 feet, the *Times'* bill was $315 for the month; in December, 1882, when the price was $1.90 per 1,000 feet, and when the electric light had been used extensively in place of gas, the bill was $338.20. This discovery has led the *Times* to the belief that the general introduction of the electric light will make the everlasting fortune of the gas companies.

ELECTRIC LIGHTING FROM BATTERIES.—Electric lighting on a large scale by means of batteries has recently been carried out in Paris. The Comptoir d'Escompte is lighted by 50 arc lamps, Siemens' and Gravier's, and 100 Swan lamps, the current being supplied by Jarriant and Grenet's bichromate batteries. The reason for employing this antiquated means of carrying out the lighting of the place is stated to be because no engine or gas motor is allowed on the premises for fear of fire. There are 60 batteries of 48 cells in use, each feeding an arc lamp or a group of from 8 to 10 incandescent lamps. The E.M.F. of each battery of 40 cells is about 82 volts, and the current 24 amperes. Messrs. Jarriant and Grenet estimate that each battery in full work develops energy equal to one and a half horse-power. The liquid in the batteries is renewed by special compressed air apparatus and numerous pipes.

TELEPHONE DEPARTMENT.

DISSOLUTION OF A COMPANY.—The directors of the Inter-State Telephone Company have petitioned the Supreme Court, of New York, to dissolve it, and Judge Barrett on Jan. 4 appointed Nelson J. Waterbury as referee to take testimony in the case. The company is said to have no property and no debts.

DALLAS, TEX.—On Jan. 1, 1882, there were 100 telephones in use in Dallas, with 60 miles of wire and 155 poles. Under the able management of Mr. D. M. Clower the number has increased to 228 telephones, 136 miles of wire and 505 poles. In addition to this the service has been extended to Lisbon, Lancaster, Red Oak and Waxahachie, thereby placing these thriving towns in communication with the metropolis of North Texas. The company expects to greatly extend its field during the present year.

NEW ENGLAND.—A statement of the business of the telephone companies under Lowell management, for the month of December, 1882, shows a net gain for the National Bell Telephone Company, of Maine, of 56 subscribers, making the total on Jan. 1, 3,675. The Boston & Northern Company has gained 138, making the total 2,665; the Bay State Company gained 112, making its total 2,189; the Suburban Company gained 118, its total being 903, and the Union Company gained 20, bringing its total up to 256. This is a grand total net gain of 444 subscribers during the month, and makes the total number on Jan. 1, 1883, 9,688.

REMOVAL.—Messrs. Delano & Haines, who are becoming widely known as an active and prominent firm of promoters and brokers, have left their old quarters at 55 Broadway, New York, and taken a large and elegant suite of offices in Temple Court, No. 5 Beekman street, where they will be pleased to see their friends and the public. These gentlemen have executive control of the Mexican Telephone Company and the Tropical American Telephone Company, Limited, both of which, we are assured, are making rapid progress in the introduction of telephones in their respective territories, and verifying the expectations of their friends and supporters.

THE STABLER INDIVIDUAL CALL.—We learn from a Washington paper that this signal, the invention of Mr. James P. Stabler, of Sandy Spring, Md., and of which we gave a description in a former number, is being tested in the telephone exchange of that city. The instruments have been in use for some days on one of the busiest lines of the exchange, connecting with a lumber dealer, a flour merchant, a planing mill, a stone yard and a brewery, and have been successfully tried on a telegraph line 85 miles long, during a severe rain storm. The object of the invention is to cut out all subscribers except the one using the wire, and by thus insuring privacy to communications, to remove the most serious objection to putting more than one subscriber on a line.

CHANGES IN PENNSYLVANIA.—On Jan. 1 the telephone interests of the Lehigh Southern and East Pennsylvania Telephone Companies were consolidated, and the different exchanges in Eastern Pennsylvania connected together. The new consolidation will be controlled by the Pennsylvania Telephone Company, recently organized at Harrisburg. Mr. D. B. Macquarrie has been appointed superintendent of the central division, which embraces the former territory of the Eastern Pennsylvania Telephone Company, and will have his office at the Reading exchange. Messrs. H. W. Spang and C. Holton give up the telephone, and will devote themselves to the manufacture of electric lights, generators, etc. Successful tests of the electric light have been made in Reading, and its general adoption in the leading business establishments is confidently looked for.

NASHVILLE, TENN.—The general management of the Cumberland Telephone & Telegraph Company is controlled by Capt. Paul J. Marrs, formerly of Kentucky, who is assisted by Mr. H. M. Dury. The night business, which is very large, is managed by Mr. Albert J. Garrett, of Nashville, and the day business by Mr. Thomas Getz, and eight lady operators. Since taking charge of the business by these gentlemen, rapid strides have been made. Nearly a thousand miles of wire have been put up, several fine cables have been run, and about five hundred subscribers, scattered all over the city, have taken the telephone, and new orders are daily received for instruments. Mr. Thomas Gallagher, the superintendent of construction of lines, and Mr. Chas. Getz, superintendent of instruments, have now about forty men at work at different points throughout the city and country, erecting new lines. The company secured the finest cedar poles in the erection of its lines. Columbia, Pulaski, Tullahoma, Decatur and other adjacent towns will soon be reached and the lines placed in working order.

DASHES HERE AND THERE.

TO PREVENT TELEGRAPH CONSOLIDATIONS.—In the Pennsylvania House of Representatives, on Jan. 10, a bill was introduced to escheat to the Commonwealth the property of telegraph lines which violate the constitution by consolidating with each other.

THE MUTUAL DISTRICT MESSENGER COMPANY, OF BOSTON.—This company has been incorporated with a capital stock of $100,000. Its officers are: Parker C. Chandler, president; Dennis J. Hern, treasurer; James M. Pendergrast and the president and treasurer, directors.

A WESTERN UNION TEST SUIT.—It is reported that a prominent Western Union stockholder is about to institute a friendly suit against that company, for the purpose of gaining a speedy decision upon all the vexed questions, in regard to the alleged illegal over-issue of stock, concerning which so much litigation is pending.

EASTERN TELEGRAPH COMPANY'S ELECTION.—Directors of the Eastern Telegraph Company met at Augusta, Maine, on Jan. 10. Governor Frederick Robie was re-elected president, and Mr. Frederick E. Richards, of Camden, secretary and treasurer. It was voted to extend the lines from Bangor to Bar Harbor, and from Bath to Rockland.

A SUCCESSFUL ELECTRIC RAILWAY.—The electric railway between Portrush and White Rock, Ireland, is about two and a half miles long. Dr. Siemens, on Dec. 21, applied his electric system to the cars which are to be run on the road, and the result was considered a complete success, a speed of ten miles an hour being attained, both in coming and going.

STOCK QUOTATIONS.—Telegraph and electric light stocks were quoted as follows on Wednesday, the first three being the closing quotations on that date:

	Bid.
Western Union Telegraph	82
Mutual Union Telegraph	22
American Cable	06
Edison Electric Light	375
Fuller Electrical	82
United States Electric Light	120

MORE ELECTRICAL AWARDS AT PARIS.—L'Academie Nationale, Agricole, Manufacturiere et Commerciale, of Paris, announces the following awards for electrical inventions in 1881-82: Diplomas of honor to Messrs. Gloesner, of Liege, Belgium, and Siemens & Halske, of Berlin, Prussia, for electrical apparatus; gold medals to Messrs. Clovis-Dupuis, of Lisieux, Calvados, for their electrical railway, Cumming & Brinkerhoff, of New York, for their periphery-contact disc electrodes for telegraphic machinery, and M. Goppelsroeder, Basle, Switzerland, for electro-chemical dyes; silver medals to M. Barda, Paris, for electro-medical baths; bronze medals, none.

THE CAMERON-GOULD SUIT.—Attorney General Russell appeared in the Supreme Court, Chambers, New York, on Jan. 9, and made a new application in behalf of Messrs, Cameron and Gould, for leave to vacate the charter of the Mutual Union Telegraph Company. It will be remembered that Judge Arnoux recently set aside a similar order which had been granted by Judge Truax, on the ground that the petition was not verified by the Attorney General, and that he did not appear personally in the matter. To avoid any further technical objection the Attorney General presented the petition in person to Judge Barrett, who signed the order.

THE WESTERN UNION IN THE SOUTH.—A New York *Herald* correspondent has again had an interview with that mysterious "prominent electrician" in the South—this time at Norfolk, Va.—and devotes two columns to charges of poor telegraph service in that section. Among other things, it is said that under the Gould regime some of the most competent men have been discharged and their places never supplied. The demand for additional men to handle the increasing business, it is asserted, is not filled, and when absolutely necessary to fill a vacancy, a cheaper clerk or operator is obtained. The condition of the messengers is the worst of all, for the prominent electrician knows of one poor boy whose wages is so low that he is restricted entirely to a vegetable diet!

NEW YORK CITY ITEMS.

Echoes from 195.

Mr. Thomas Miler's condition is much improved.

Mr. Thomas Allen is still very weak and confined to the house.

Mr. James Hurley is thought by some to bear a facial resemblance to Mr. Jay Gould.

Messrs. D. Wark, Mickley, W. E. Van Nostrand and A. Field have gone to Oil City, Pa.

Mr. A. P. Cottingham, for many years an operator in 195, died in Easton, Pa., on the 9th inst.

Mr. S. L. Griffin, formerly chief operator in 195, is now manager of a produce exchange in Mexico, Mo.

Mr. E. F. Welch has been transferred from the Commercial News Department to the third Boston quad.

After a rest of two years the athletes of the office are mooting the question of a series of games for the coming spring.

Mr. K. C. Murray, of pleasant memory in 195, is now manager of the Southern Telegraph Company's Office in Norfolk, Va.

Miss Downs, of Bridgeport, Conn., office, paid 195 a flying visit last week, chaperoned by Mr. John Brant, who has worked the Bridgeport quad in 195 for over ten years.

Some commotion was caused last Saturday evening by one of the operators falling in a faint near the door. Constant extra work is said to have been the probable cause, notwithstanding which the same operator was again working extra the following day.

A question in arithmetic is interesting some of the operators, viz.: If a man contracts to work for four different men, on any one Sunday, at the rate of three dollars per man, payable on pay day, and sub-lets the work to four other men at one dollar cash each, how much does he net by the operation?

Mr. S. B. Lambdin, of 195, expects to have his joke book, which we recently mentioned in this column, ready for sale in about two weeks. It will be entitled "Jumbo's Jolly Jokes," will contain 64 pages, and the price will be 15 cents. He has been so busy with other matters that he has only

lately had time to attend to the book. He announces that the jokes will all be curious, brand new and of an entirely original kind.

When the Western Union Company first changed its location from 145 Broadway to 195 Broadway, and the business was transferred to the large operating room on the seventh floor, everything was new and elaborately got up, regardless of expense. Even the operators' chairs were expensive, as well as uncomfortable. The backs are punctured to read, "W. U. T. Co." Most of these chairs are nearly worn out, and some of the operators are hoping that when new chairs are ordered they will be more comfortable and less ornamental. Some of the "old-timers" procure their own chairs, and thus secure a degree of comfort that the less progressive operators cannot appreciate. When one becomes tired with long sitting and attempts to stand up for a rest, cries of "Sit down!" from some of the unfeeling operators soon bring him to his seat.

In an office of the dimensions of 195, any one face is seldom missed, unless it may be that of some one in authority; so it often happens that a man who has worked here for years may leave, and his absence not be noted, except by intimate friends, until months have elapsed. Indeed men pass each other, and at times work side by side for months, and do not even know each other's name. Sometimes the changed appearance of a fellow-worker, either by reason of an added tan and color to the face, or a paler and thinner countenance, caused by a few weeks' absence, on a vacation, or a bed of sickness, as the case may be, will induce the question, "Where have you been?" Commenting on this topic the other day, one operator asked another the whereabouts of a certain office girl, in whom the one addressed had been wont to take an interest. The reply was that the young lady had been his wife for some months. But the information is not always so happy, as, for instance, when, as occurred the other day, inquiry was made for an operator who had been in his grave for more than a year.

Other City Items.

Mr. J. C. Hueston, who recently resigned the position of general agent of the Associated Press, has begun the practice of law in this city, at 170 Broadway.

The New York Electrical Society was to meet at the Stevens Institute, Hoboken, on Jan. 12, to witness some new experiments by Prof. A. M. Mayer, demonstrating Ohm's law, and other novelties. We regret that the time of our going to press prevents our reporting the meeting.

Mr. Clark B. Hotchkiss has compiled a general directory and tariff book for patrons of the Mutual District Messenger Company, which will be of great value to them as well as to employes of the company. It shows the tariff rate to be paid for sending a messenger to any part of New York and suburbs, and what length of time a messenger should occupy in going to and from any part of the city, besides being a directory to all the places of public business in the city and surroundings. The volume represents a vast amount of patient industry.

Mr. Sidney F. Shelbourne, president of the New York Electric Lines Company, has made application, on behalf of the company, to the Board of Aldermen of New York city for permission to lay its lines of wires beneath the streets, with the necessary test boxes and district connections. The application states that there are more than thirty companies in the city using electricity for various purposes, only one or two of which are financially able to comply with the growing demand that wires shall be put under ground, and the company is organized for the purpose of leasing wires to such companies. The matter was referred to a committee.

MUTUAL UNION, 195 BROADWAY.—Mr. J. C. Tallman has been for the past two weeks afflicted with pneumonia. Late arrivals are Messrs. Butler, Cusack and Brennan; departures Messrs. Ahern, Brady and O'Brien. Mr. Walter Prentice is introducing the Phillips code, now in use for the transmission of press. Mr. W. J. Curtis teaches and and transmits the code at Buffalo. Mr. Thomas Geary was one day last week the recipient of a pretty and useful present in the shape of a gold pen from a lady operator on his wire, as a token of appreciation of his courteous disposition. Mr. J. W. Roloson, of the M. U. office at the Stock Exchange, is an excellent penman as well as a skillful operator. Some beautiful specimens of his workmanship were executed on New Year's calling cards, which were much admired.

The annual meeting of the Gold & Stock Life Insurance Association was held on Jan. 8. The president, Mr. C. S. H. Small, stated what had been accomplished by the association since its formation, and said that, judging from the standing of the association now, he looked forward to its being a source of great benefit in the future. The secretary's report showed that the association has increased its membership during the past year, and that its standing as an incorporated body is first-class at insurance headquarters It also gives the pleasing intelligence that the association has not lost any of its members by death during the past year. The treasurer's report showed the money received and disbursed, leaving a good balance in favor of the association in the hands of the treasurer. Some important amendments to the constitution and by-laws were adopted. The election of officers resulted in the following choice: President, C. S. H. Small; vice president, J. E. Hamilton; treasurer, Carl Winkel; secretary, T. J. Sullivan; Executive Committee, M. Breslin, W. H. Collins, M. Brick, A. G. Waring, and G. E. Scott.

PERSONAL.

ENGLAND.—The cable announces the death of Mr. C. V. Walker, F. R. S., past president of the Society of Telegraph Engineers and of Electricians.

BIRMINGHAM, ALA.—Mr. B. D. De Forest, who is temporarily managing the Birmingham telephone exchange, will join in the Faure Electric Storage and Light Company as soon as it begins operations.

ST. JOHN, N. B.—Miss Minnie Odell has returned from a visit to her friends in Washington, Conn. Mr. W. S. Rogers has been transferred to Moncton, N. B., office, where recent changes have been made. All the railway telegraph offices are now confined to one room in the station. Mr. W. Crandall is manager of this and the Western Union office up town. Students are not so numerous as they were.

BURLINGTON, CEDAR RAPIDS & MINN. RAILROAD.—Mr. G. A. Goodell is chief train dispatcher; Messrs. F. B. Hagarman, W. F. Doran, and H. R. Treat are dispatchers of the second and third divisions; R. C. Wascott, J. H. Ham and O. L. Wilson of the first division; Mr. E. W. Titus of the Muscatine, Iowa City and Milwaukee divisions; Mr. D. L. Isgrigg of the Pacific division, and Mr. W. P. Ward night clerk. Mr. Hagarman has been in the company's service for twelve years.

G. V. C. R. R., NEW YORK.—Mr. S. W. Haight, is superintendent of telegraph and train dispatcher of this new road, which is just opening for business. His office is at present at Mt. Morris, but will remove to Rochester as soon as the line is completed to that point. Mr. Haight was formerly train dispatcher of the B., N. Y. & P. R. R., at Buffalo, and has the entire respect of the operators. Mr. D. C. Neill, formerly of Port Allegany, Pa., is agent and operator at Mt. Morris; Mr. C. M. Stedwell, formerly of Port Allegany, Pa., is at Belfast, N. Y.; Mr. A. W. Frobes, formerly agent and operator at Elma, N. Y., holds a similar position at Nunda, and Mr. E. B. Kotch, is agent and operator at Fillmore, N. Y.

ST. JOSEPH, MO.—Mr. Charles R. Berry, an operator of the K. C., St. J. & C. B. R. R., at the round house in St. Joseph, having recently been promoted, his fellow-operators, by whom he is held in much esteem, tendered him a banquet, which took place on Dec. 28. Hon. T. W. Harl, of East Atchison, presided, and in a brief address, at the opening of the ceremonies, paid a high tribute to the character of the excellent young gentleman in whose honor the company had assembled. Speeches were also made by Mr. O. M. Gilmer, of the St. Joseph *Gazette*; Mr. C. G. Hall, provision broker; Mr. Dyer, train dispatcher for the K. C., St. J. & C. B. R. R.; Mr. Proctor and Mr. Mann, fellow-operators; Mr. R. S. McAllister, western agent of the Erie & North Shore Dispatch Fast Freight Line; Constable Carson, Mr. William Dysart, Mr. Marteny, book-keeper for the St. Joseph *Herald;* Mr. Berry and others. The occasion was a very enjoyable one, and many fine sentiments were uttered.

HARTFORD, CONN.—The business of the Western Union office is ably handled by the following staff: Manager, Mr. J. H. Lounsbury; chief operator, Mr. S. L. Nash; New York quad, Mr. J. L. Boyle; way wires, Messrs. G. H. Albee and T. H. Goodrich; "ticker" circuit, Mr. D. E. Smith, assisted by Mr. J. Moran; Associated Press, Mr. C. E. Cook, day, and Mr. Joseph Nihan, night; day clerks, Messrs. J. H. Moran and J. H. Hartnett; night clerk, Mr. Thomas Ganley; last, but not least, Mr. W. H. Babcock, night manager, chief and operator. Mr. S. B. Curtis, as head clerk, has charge of all office accounts. Mr. Benjamin Walsh, one of the most popular men of the office, has lately been occupied in nursing a sick friend. Mr. Lorenzo Hempstead, an "old timer," gives entire satisfaction on the Commercial News Department circuit. He can fully recall the time when "Old Man Kay" was a messenger at Bangor, Maine.

WASHINGTON, D. C.—Mr. E. A. Leslie, superintendent of the Mutual Union Telegraph Company, was the recipient of some beautiful and expensive Christmas gifts, from the employés of his districts. The presents consist of an elegant gold-headed ebony cane, a gold scarf-pin, with diamond setting; a handsome silver flask and match-box, all beautifully and appropriately marked. The presentation was made in the operating-room, and was a surprise to Mr. Leslie. He was called from his office below on some business pretext to the operating-room, where Mr. I. E. Fleming, after a neat speech, handed him the gifts. He was so completely taken by surprise that he could say but little, but what he did say evidently came from the heart. Mr. Leslie is widely known to the telegraphic fraternity, having been himself an expert operator before his advancement to his present responsible position, and the presentation was an expression of personal friendship quite as much as of respect to an employer.

CHEYENNE, WYO.—Mr. C. F. Annett, superintendent of telegraph of the Union Pacific Railway at Cheyenne, having severed his connected with that company, for the purpose of given his entire time and attention to the Wyoming Telegraph & Telephone Company, the operators on his division last week presented Mr. and Mrs. Annett with an elegant silver water service and a silver and gold toilet set. The pitcher bears the inscription: "Presented by the Telegraphers of the Mountain Division of the U. P. Ry., December, 1882." At the base of the pitcher are engraved two telegraph poles with two connecting lines of wire, one of these wires broken, between the ends of the wire the number "73," and beneath the name of the recipient. Accompanying these souvenirs was an address engrossed on parchment, and embellished with representations of telegraph appliances, artistically executed by Mr. Robert Empey, of the Western Union office. Mr. and Mrs. Annett were completely taken by surprise, but the latter, quickly recovering, slipped away, and shortly after invited the gentlemen to an impromptu but enjoyable collation. The following offices in Mr. Annett's division united in the testimonial: Main line: Cheyenne, Hillsdale, Egbert, Pine Bluffs, Antelope, Potter, Lodge Pole, Chappell, Denver Junction, Big Springs, Ogalalla, Alkali, O'Fallon's, and North Platte. Branch line: Snyder, Iliff, Merino, Sedgewick, Sterling, Crook, Duell, La Salle, Hardin and Orchard.

NEW ORLEANS.—The employés of the Western Union office, desiring to make a suitable Christmas present to their chief operator, Mr. W. D. West, obtained the handsomest gold-headed cane to be found in the city, and an extra fine silk hat. The head of the cane is in the form of an eagle's head, with ruby eyes. New Year's day being the anniversary of Mr. West's marriage, it was thought best to postpone the presentation until then. The articles were sent to his residence while he was at the office, and the pleasant task of making the presentation fell to Mrs. West. The correspondent who sends us the account of this pleasing incident says: "We have heard of many presents made during the holidays to managers and chief operators, some of them deserving, and others whose motive it is hard to understand; certainly not a recognition of kindness and square dealing toward the operators. The presentation in this instance, however, is a genuine expression of estrem. Mr. West has been connected with the office for eleven years, and has been chief operator for about six years. His ability in the management of the company's affairs, his gentlemanly, honorable and just treatment of the operators, have long been recognized and appreciated. We can safely say, as an expression of the opinion of the many operators who have been thrown among us, whether in healthy or sickly times, during the eleven years he has been here, that he is one of the best and most favorably known and ablest chiefs in the Western Union service."

DIED.

SHULL.—On Jan. 3, 1883, of consumption, J. T. Shull, late operator and ticket agent, I. & St. L. Ry., at Brooklyn, Ill.

THE NEW NAME.

Nothing better illustrates the rapid advancement science in electrical matters than the enlarged and handsome form in which THE OPERATOR appears to-day; and not the least part of the illustration is the change in it title, which necessity and truthfulness have forced upon us, to THE OPERATOR AND ELECTRICAL WORLD.

As the mouthpiece of the telegraphic profession we have during the past nine years made a record, the keen appreciation of which is best shown in the unwavering unanimity with which our efforts have been supported by the profession. But, from catching up and recording the spirit of our widespreading telegraphic enterprises, we have long since found the necessity for not only following the record but for marching in advance and leading men on to new positions and new ideas; and, since THE OPERATOR has meanwhile grown to be an epitome of the electrical world we should take pride in announcing that fact in its title.

Since THE OPERATOR was founded it has witnessed the most unprecedented growth of the telegraph; the invention of the telephone, and its extension to the most remote portions of the earth; the improvement of the electric light until its use has become almost universal; the invention of the quadruplex and the perfection of the duplex, both on cables and land lines; since then a single telegraph company in this country—the Western Union—as will be seen from the annual report of President Green, published in our Oct. 14th issue, has doubled the number of its miles of poles and wires, as well as of its offices, the figures being 71,585, 175,735 and 6,188 respectively, in 1874, and 131,060 374,368, and 12,068, in 1882, and has increased the number of messages handled from 16,000,000 in 1874, to 82,000,000 in 1882.

Similar changes have taken place all over the world, and with all these vast improvements THE OPERATOR has kept well to the fore, in size, frequency of issue, scientific research and general information; and since it has grown to be a reflex of the entire electrical world, it is only proper that THE OPERATOR AND ELECTRICAL WORLD should put forth its claims in name as well as in fact.

The recent change from a semi-monthly to a weekly; the sweeping changes inaugurated to-day, in the increase of size and other improvements, and its hard-earned reputation as a cosmopolitan journal, should be sufficient guarantees for the future course of THE OPERATOR AND ELECTRICAL WORLD.

ELECTRICAL PATENTS ISSUED.

Week ending Jan. 2, 1883.

Dynamo electric machine; Alexandre Chertemps and L. Dandeu, Paris, France	270,017
Electric arc lamp; Charles A. Hussey, New York	269,938-9
Electric burglar alarm; Charles T. Jackson, New York	269,862
Electric lamp; Charles A. Hussey, New York, N. Y	269,937
Electric mallet; Joseph R. Finney, Pittsburgh, Pa	170,187
Electric Motor; William L. Silvey, Castleton, Ind.	369,888
Electric synchronizing apparatus for time-pieces; James Hamblet, Brooklyn, N. Y	270,058
Electric thermostat; Thomas Reeve, Brooklyn, N. Y	269,960
Electric telephone; Henry B. Porter, Chicago, Ill	269,879
Electric vehicle; Joseph R. Finney, Pittsburgh, Pa	270,186
Electric wire cable; James Mackintosh, Philadelphia	269,868
Insulator for the suspension of electrical wire conductors; Paget Higgs and W. Courtenay, New York, N. Y	269,933
Telephone transmitter and receiver; James H. Rogers, Washington, D. C	269,884
Telephonic transmitter; George E. Shaw, Chicago	270,136
Watchman's electric time detector; James E. Richards, Cedar Keys, Fla	270,125

BUSINESS NOTICES.

The best proof of the real merit of the Steel Lever Key is to be seen in the promptness with which the imitators come to the front. The great success of this invention has caused to be put forward several varieties of absurd and inferior contrivances, which are in all cases loudly advertised as "STEEL LEVER KEYS," because, when sold under that name, many persons will buy, believing them to be the genuine article.

The genuine Steel Lever Key, J. H. Bunnell's patent, February, 1881, is manufactured solely and exclusively by J. H. Bunnell & Co., 112 Liberty street, N. Y. Its greatest advantages in construction are covered by the patent, and these especial advantages which have made this key popular in every part of America, are not to be found in any of the poor imitations urgently offered as *Steel Lever Keys.* Therefore, if you want the genuine Steel Lever Key and do not wish to be disappointed with a worthless imitation, buy only from the manufacturers direct. All orders should be addressed to

J. H. BUNNELL & CO.,
112 Liberty street, N. Y.

An advertisement of hard porcelain insulators will be found in this issue. Telegraph and telephone companies and others using insulators in quantities should communicate with the Union Porcelain Works, Greenpoint, N. Y.

With the first number of its fourteenth volume, dated Saturday, January 6, an addition will be made to the title of THE OPERATOR, and it will hereafter be known as

THE OPERATOR

AND

ELECTRICAL WORLD,

AN ILLUSTRATED WEEKLY JOURNAL

FOR

Telegraphists, Telephonists, Electricians and Electrical Engineers.

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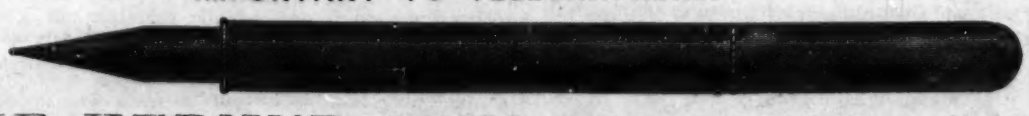

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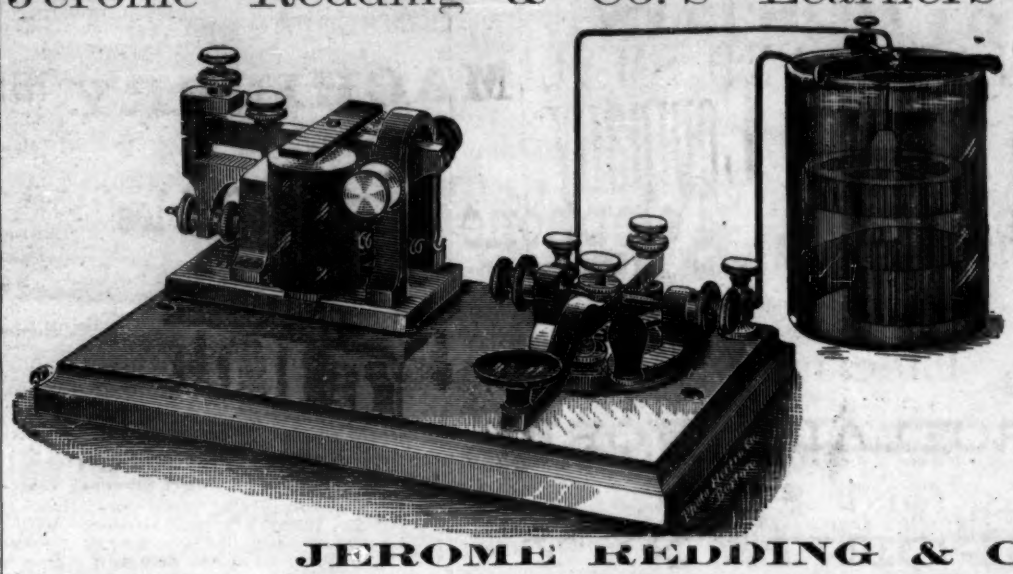

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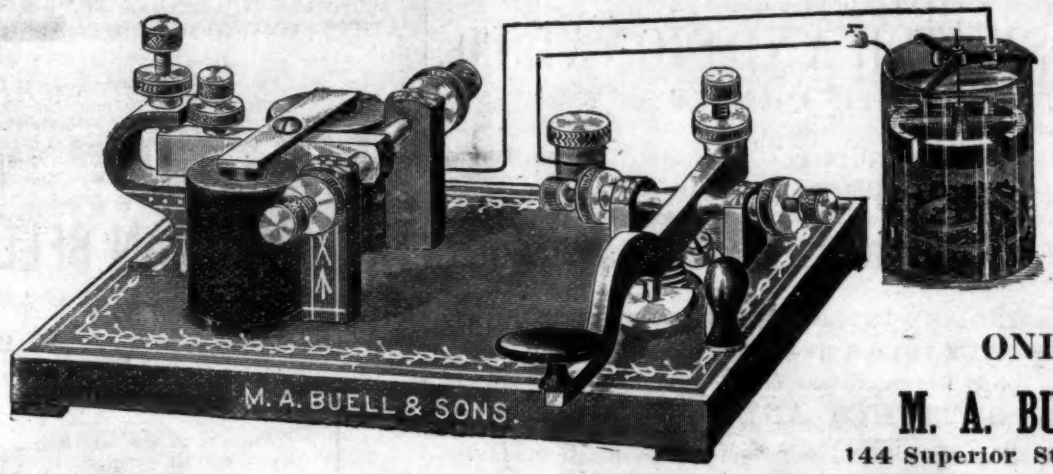

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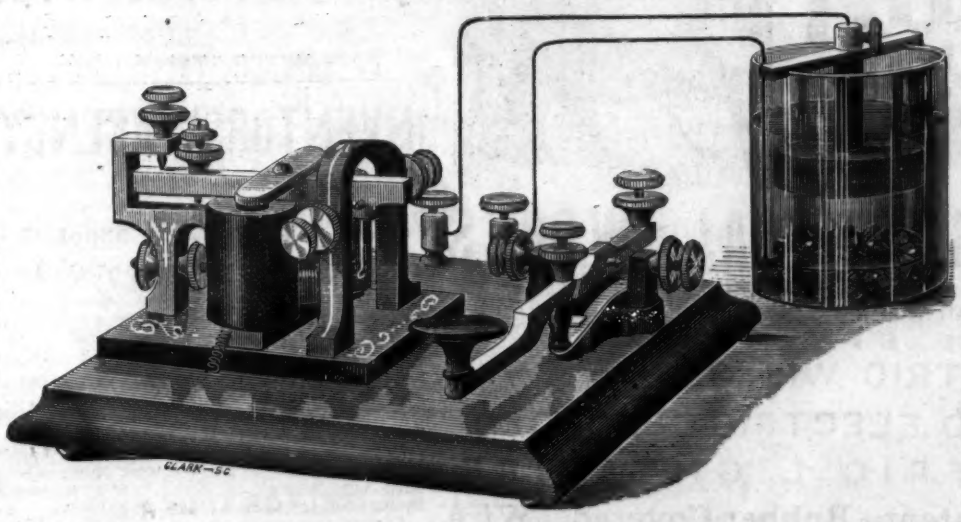

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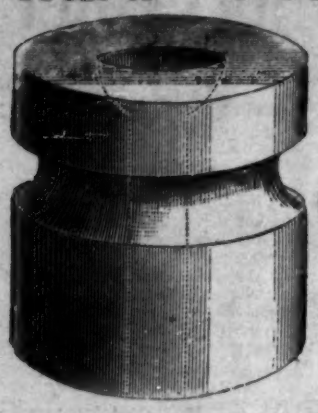

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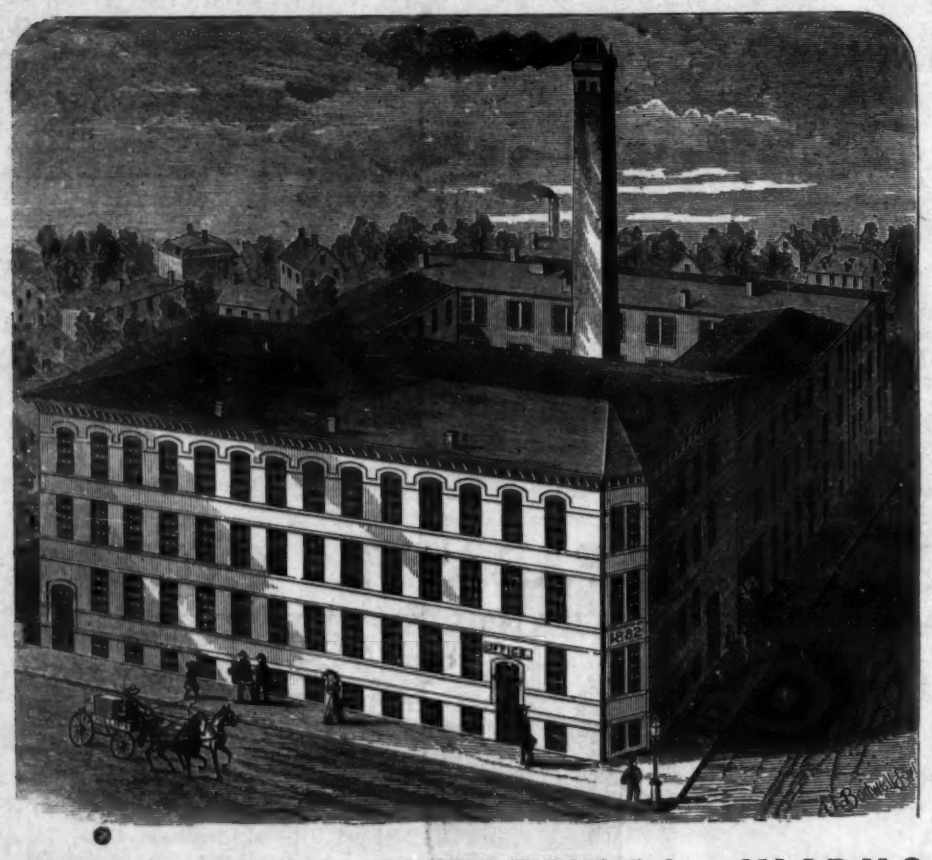

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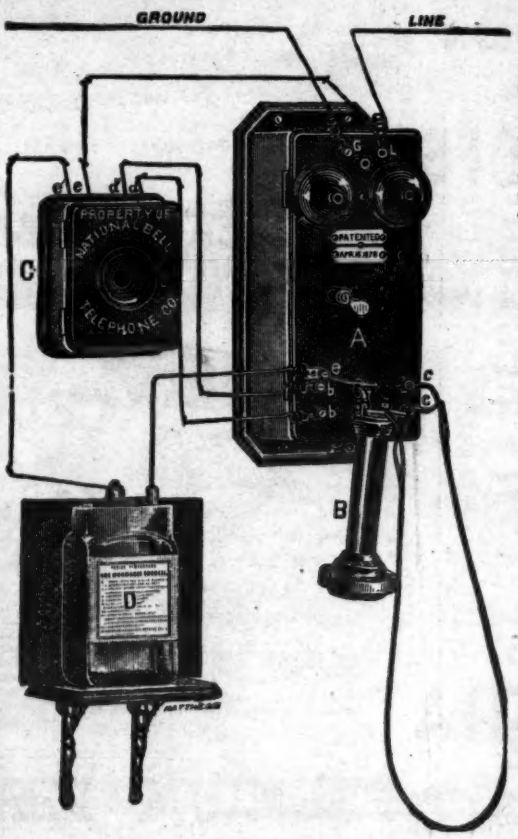

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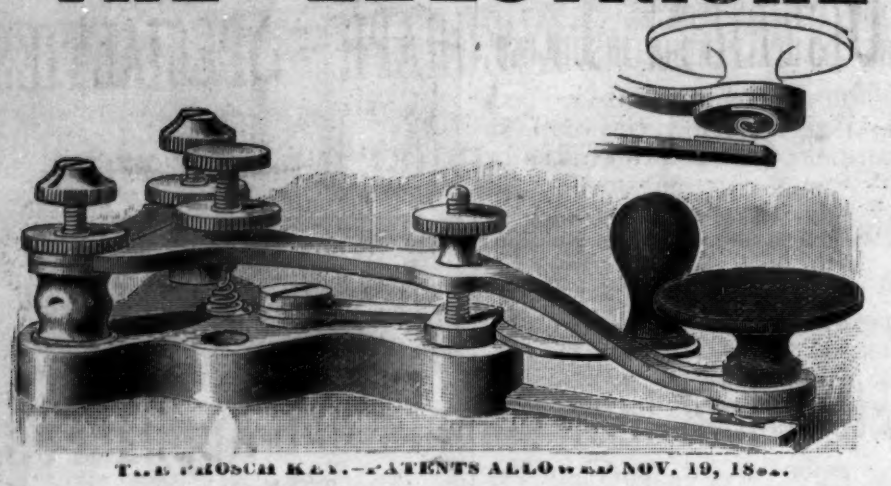

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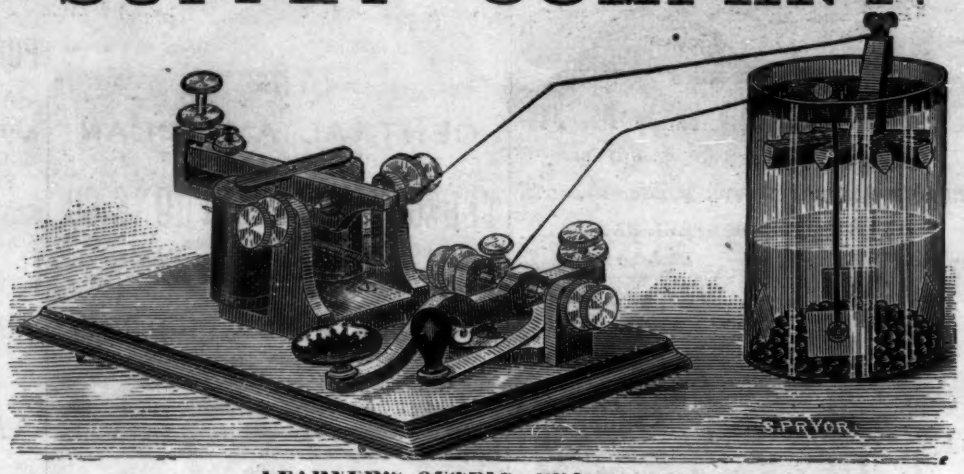

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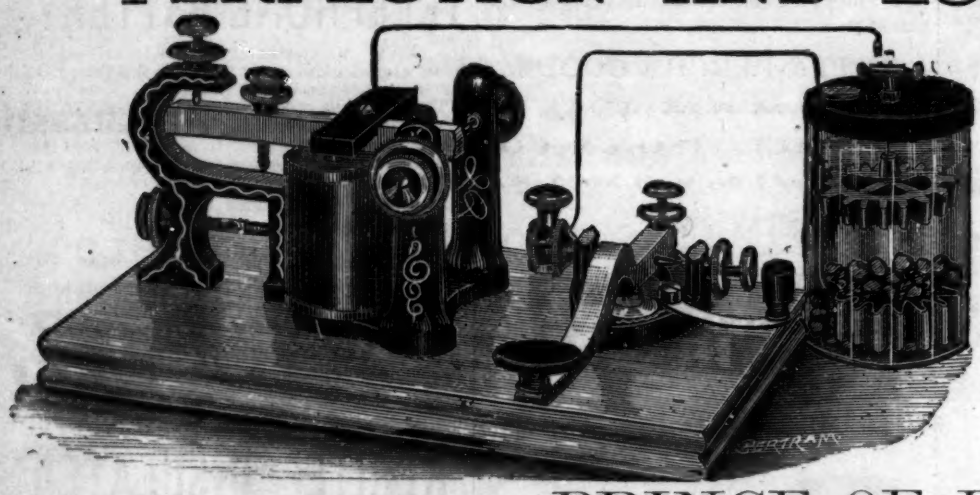

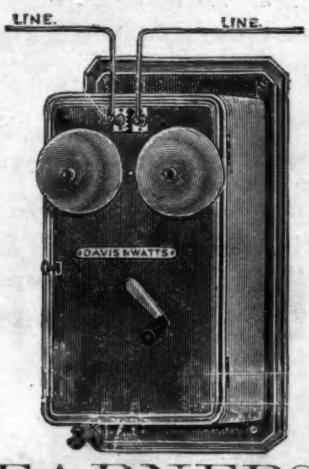

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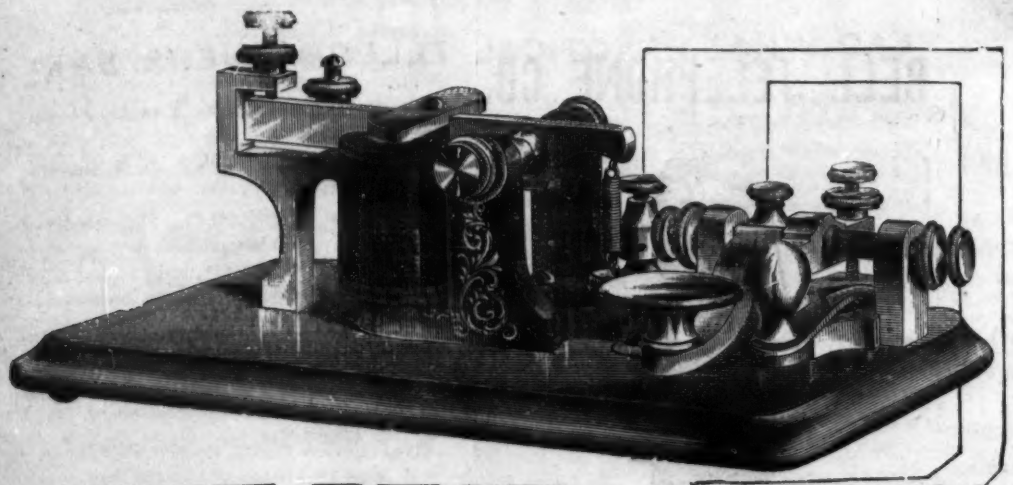

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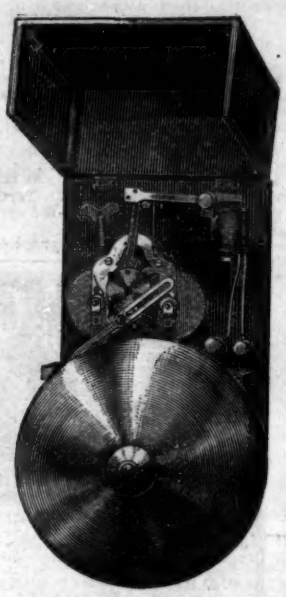

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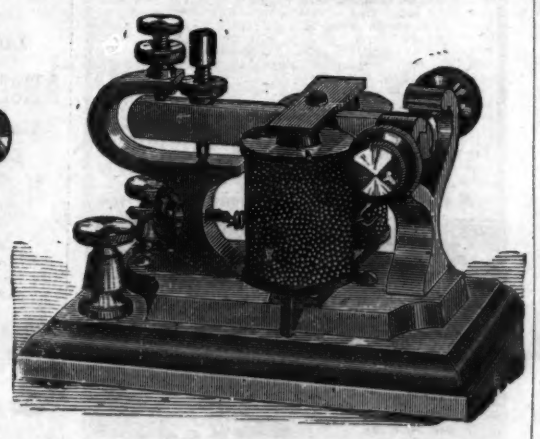

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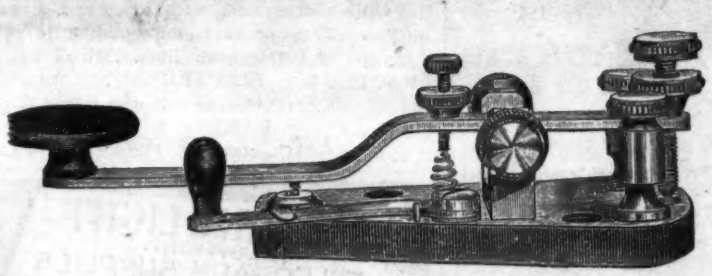

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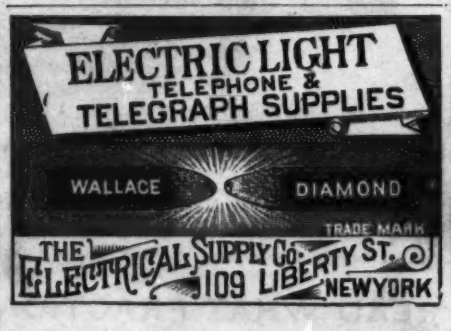

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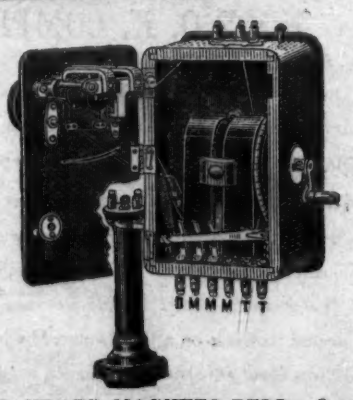

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